Appendix I – Water Resources

Appendix I-1 – Will-Serve Letters

COPY

...Dedicated to Community Service
2554 SWEETWATER SPRINGS BOULEVARD, SPRING VALLEY, CALIFORNIA 91978-2004
TELEPHONE: 670-2222, AREA CODE 619 www.otaywater.gov

January 20, 2011

Project No: P1438-010000
Activity: 3111

Gary Chandler
President
Pio Pico Energy Center, LLC
P.O. Box 95592
South Jordan, UT 84095

SUBJECT: Recycled and Potable Water Service for Pio Pico Energy Center
APN: 648-040-45-00; Potential Power Plant - Otay Mesa Area

Dear Mr. Chandler:

Otay Water District (District) has reviewed the Pio Pico Energy Center (Project) requirements, and we have or will have the capacity and are willing to provide water subject to our normal and necessary business practices.

The Project will require a Water Supply Assessment to meet the requirements of Senate Bill 610. As provided to the District, the projected peak day average flow is calculated at 575 GPM. The Project can be served by an existing 12-inch potable main and an 8-inch recycled main located at Calzada de la Fuente, parallel to the north Project boundary. The District supports the Project's desire to maximize recycled water in-lieu of potable water. The District has designed a transmission recycled water main on Wueste Road that, once in service, will supply recycled water to the Otay Mesa Area. The Project can be served with potable water via new connections within or near the Project site. Recycled water will be available to the Project upon completion of the Wueste Road transmission main and via new connections within or near the Project site.

Prior to connection and water service, the Pio Pico Energy Center, LLC will be required to bond and sign a Construction Agreement for the Project and make all necessary District deposits to cover engineering and inspection costs.

The applicant should contact all necessary agencies including the Fire Department and sewer purveyors for any requirements. The District should then be contacted at (619) 670-2241 regarding water main connections, service laterals, backflow devices, and/or meter costs, and any other conditions that may have arisen since this letter was written for this Project.

Potable water availability is subject to all requirements in effect at this time and you are strongly encouraged to adopt water conservation measures throughout the development.

Should you have any questions you may contact me at (619) 670-2243 or via e-mail at dcharles@otaywater.gov.

Sincerely,
OTAY WATER DISTRICT

David T. Charles
Public Services Manager

DTC:mlc

County of San Diego

RICHARD E. CROMPTON
DIRECTOR

DEPARTMENT OF PUBLIC WORKS

5500 OVERLAND AVE, SUITE 310
SAN DIEGO, CALIFORNIA 92123-1295

(858) 694-2212 FAX: (858) 268-0461
Web Site: www.sdcounty.ca.gov/dpw/

January 27, 2011

Gary Chandler, President
Pio Pico Energy Center, LLC
P.O. Box 95592
South Jordan, UT 84095

Dear Mr. Chandler:

AVAILABILITY OF SEWER SERVICE – PICO ENERGY CENTER, LLC (ASSESSOR PARCEL NUMBER 648-040-45-00)

The proposed Pico Energy Center, LLC (PPEC) is located in the East Otay Mesa Sewer Maintenance District (District), which is administered by the Department of Public Works (DPW). The PPEC plans to discharge cooling tower and other process wastewater into the sewer system at a peak day average flow projected to be 104 GPM. The PPEC project, as understood by DPW, would discharge its wastewater by connecting to existing sewer facilities near the intersection of Alta Road and Calzada de la Fuente.

Based on this understanding and the assumption that PPEC will comply with all conditional requirements of the District, as well as the City of San Diego, including sewer discharge constituent limits, DPW believes there are adequate sewer facilities to serve this project. This letter is intended to describe the current availability of sewer service, but does not constitute a commitment of facilities or service by the District.

Should you have any questions, please phone me at 858-694-2714 or email at Daniel.Brogadir@sdcounty.ca.gov.

Sincerely,

DANIEL S. BROGADIR
Department of Public Works
Wastewater Management

DSB:jww

c: Mike King, Apex Power Group
Dave Jenkins, Apex Power Group

Appendix I-2 – Recycled Water Quality Data

...Dedicated to Community Service
2554 SWEETWATER SPRINGS BOULEVARD, SPRING VALLEY, CALIFORNIA 91978-2096
TELEPHONE: 670-2222, AREA CODE 619

January 18, 2008

Mr. John Robertus
Executive Officer
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, Ca. 92123-4340

Dear Mr. Robertus:

Enclosed is the 2007 Annual Report for the Otay Water District's Ralph W. Chapman Water Recycling Facility. Graphical and tabular summaries for all of the previous year's monitored constituents are included for your review. A supplement to this report will submitted with additional information after the new Master Reclamation Permit, R9-2007-0038, has been in effect for a full year.

The Ralph W. Chapman Water Recycling Facility supplies full Title 22 disinfected tertiary recycled water for spray irrigation of parkways, streetscape, neighborhood parks and common slopes within the Rancho Del Rey, Otay Ranch, Sunbow, Eastlake, Rolling Hills Ranch and Duncan Ranch communities.

If you have any questions regarding these summaries or the operation of our reclamation facility, please call me at (619) 670-2271 at your earliest convenience.

Cordially,

Dale Kreinbring
Treatment Plant Supervisor

...Dedicated to Community Service
2554 SWEETWATER SPRINGS BOULEVARD, SPRING VALLEY, CALIFORNIA 91978-2096
TELEPHONE: 670-2222, AREA CODE 619

February 14, 2008

Annual Discharge Report, 2007

Otay Water District
Ralph W. Chapman Water Recycling Facility

SCR: 251548: MVALD
ORDER NO. R9-2007-0038; MASTER RECLAMATION PERMIT
WDID No. 9 000000217

Certification Statement

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Gary Stalker
System Operations Manager
Otay Water District
2554 Sweetwater Springs Blvd.
Spring Valley, CA 91978-2096
(619) 670-2228

Dale Kreinbring
Reclamation Plant Supervisor
Otay Water District
2554 Sweetwater Springs Blvd.
Spring Valley, CA 91978-2096
(619) 670-2271

DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILITY
REPORT FOR: Monday, December 03, 2007 **DUE DATE:** 2/1/08
EXACT SAMPLE POINT:: R.W.C.W.R.F. FACILITY/EFFLUENT
SAMPLE ANALYZED BY: ALMA ORTEGA-CARRILLO/ J. SWIGGERS AND MONTGOMERY WATSON LABORATORY

ORDER NO.: 92-25
REPORT FREQUENCY: MONTHLY
SAMPLE COLLECTED BY: Julie Wilson

SIGNED UNDER PENALTY OF PERJURY: [signature]

PARAMETER	DATE and TIME SAMPLE	FREQUENCY OF SAMPLE	UNITS	SAMPLE TYPE	SAMPLE VALUE	DAILY MAX. LIMITATION	MONTHLY AVG. LIMITATION
TOTAL DISOLVED SOLIDS	12/3/2007 07:20	MONTHLY	MG/L	24 HOUR COMPOSITE	843	1600	1376
CHLORIDES	12/3/2007 07:20	"	"	"	214	532	440
MANGANESE	12/3/2007 07:20	"	"	"	< 0.002	0.09	0.03
SULFATE	12/3/2007 07:20	"	"	"	208	540	451
FLUORIDE	12/3/2007 07:20	"	"	"	0.260	1.2	0.8
IRON	12/3/2007 07:20	"	"	"	0.022	0.6	0.2
BORON	12/3/2007 07:20	"	"	"	0.440	0.8	0.7
PERCENT SODIUM	12/3/2007 07:20	"	%	"	53	61	59
MBAS	12/3/2007 07:20	"	MG/L	"	0.405	0.7	0.3
TOTAL NITROGEN (as N)	12/3/2007 07:20	"	"	"	20.9	22	9.4
ELECTRO-CONDUCTIVITY	12/3/2007 07:20	"	dS/m	"	1.36	N/A	N/A
pH	12/3/2007 07:20	WEEKLY	pH	GRAB	6.7 6.9 6.8 6.6	6-9	
						7-day average	30-day average
BIOCHEMICAL OXYGEN DEMAND	3,10,17,28	"	MG/L	"	2 2 2 2	45	30
SUSPENDED SOLIDS TOTAL	3,10,17,28	"	"	"	1 1 1 1	45	30
SUSPENDED SOLIDS VOLATILE	3,10,17,28	"	"	"	1 1 1 1		

DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT

REPORT FOR Monday, December 03, 2007 **DUE DATE:** 2/1/08

EXACT SAMPLE POINT:: R.W.C.W.R.F. FACILITY/EFFLUENT

SAMPLE ANALYZED BY: ALMA ORTEGA-CARRILLO / J.SWIGGERS AND MONTGOMERY WATSON LABORATORY

ORDER NO.: 92-25

REPORT FREQUENCY: MONTHLY

SAMPLE COLLECTED BY: Julie Wilson

SIGNED UNDER PENALTY OF PERJURY:

PARAMETER	DATE and TIME SAMPLE	FREQUENCY OF SAMPLE	UNITS	POTABLE SAMPLE VALUE WATER SUPPLY	REQUIRED 30 DAY AVERAGE	DAILY MAX. LIMITATION	SAMPLE VALUE EFFLUENT
TOTAL DISOLVED SOLIDS	12/3/2007 07:20	MONTHLY	MG/L	459	400{1}a MG/L	450{1}b MG/L	843
CHLORIDES	12/3/2007 07:20	"	"	90	200{2}a MG/L	250{2}b MG/L	214
SULFATE	12/3/2007 07:20	"	"	148	100{3}a MG/L	150{3}b MG/L	208

{1} a. This is a 12-month running average maximum increment of TDS in effluent over potable water supply
b. This is a daily maximum increment of TDS in effluent over potable water suply
c. The daily maximum of TDS in effluent shall not exceed 1,600 mg/L
d. The 12-month running average of TDS in effluent shall not exceed 1376 mg/L
{2} a. This is a 12-month running average maximum increment of Chlorides in effluent over potable water supply
b. This is a daily maximum increment of Chlorides in effluent over potable water supply
c. The daily maximum of Chlorides in effluent shall not exceed 552 mg/L
d. The 12-month running average of Chlorides in effluent shall not exceed 440 mg/L
{3} a. This is a 12-month running average maximum increment of Sulfate in effluent over potable water supply
b. This is a daily maximum increment of Sulfate in effluent over potable water supply
c. The daily maximum of Sulfate in effluent shall not exceed 540 mg/L
d. The 12-month running average of Sulfate in effluent shall not exceed 451 mg/L (pg.12)

MONTHLY EFFLUENT MONITORING REPORT
DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT

ORDER 92-25

PLANT SUPERVISOR: _____ MONTH/YEAR: Saturday, December 01, 2 DUE: 2/1/08

DATE	TREATMENT PLANT FLOW DAILY MGD	EFFLUENT DISOLVED OXYGEN DAILY mg/l	TURBIDITY CONTINUOUS DAILY NTU	COLIFORM DAILY MPN/100 ml.	COLIFORM 7 DAY MEDIAN MPN/100 ml.
12/1/2007	1.2578	9.1	0.80	<2	-----
12/2/2007	0.8489	9.9	0.70	<2	-----
12/3/2007	1.054	10.4	0.80	<2	-----
12/4/2007	0.7562	9.6	0.90	<2	-----
12/5/2007	0.8861	9.7	1.30	<2	-----
12/6/2007	0.3641	8.1	1.00	<2	-----
12/7/2007	0.831	9.1	1.50	<2	-----
12/8/2007	0.9152	9.1	1.40	<2	-----
12/9/2007	0.9522	9.2	1.40	<2	-----
12/10/2007	0.9738	9.1	1.30	<2	-----
12/11/2007	1.1444	9.2	1.30	<2	-----
12/12/2007	1.0272	9.0	1.10	<2	-----
12/13/2007	1.1611	9.4	1.00	<2	-----
12/14/2007	1.1556	9.6	0.90	<2	-----
12/15/2007	1.1924	9.3	0.80	<2	-----
12/16/2007	1.2447	9.3	0.70	<2	-----
12/17/2007	1.283	9.3	0.90	<2	-----
12/18/2007	1.28267	9.4	1.10	<2	-----
12/19/2007	1.3468	9.3	1.10	<2	-----
12/20/2007	1.0725	9.4	1.10	<2	-----
12/21/2007	0.4357	10.6	0.90	<2	-----
12/22/2007	0.3558	10.2	0.90	<2	-----
12/23/2007	0.3713	10.4	0.90	<2	-----
12/24/2007	0.3706	9.8	0.90	<2	-----
12/25/2007	0.3198	10.8	1.00	<2	-----
12/26/2007	0.3237	10.0	1.10	<2	-----
12/27/2007	0.4792	9.9	1.30	<2	-----
12/28/2007	0.4911	10.1	1.20	<2	-----
12/29/2007	0.709	9.8	1.20	<2	-----
12/30/2007	0.9072	9.9	1.60	<2	-----
12/31/2007	0.9476	9.5	1.70	<2	-----
TOTAL	**26.46**				
AVERAGE	**0.85**	**9.6**	**1.09**		

(1) The median number of coliform organisms shall not exceed 2.2/100ml.
(2) The number of coliform organisms shall not exceed 23/100ml.
(3) Effluent turbidity must not exceed 5 NTU more than 5% of the time during any 24hour period.

DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT

ORDER NO.: 92-25

REPORT FOR: Saturday, December 01, **DUE DATE:** 2/1/08

REPORT FREQUENCY: MONTHLY:

PLANT SUPERVISOR:

PARAMETER W. A. S.	DATE	VOLUME TO SLUDGE BEDS {GALLONS}	VOLUME TO S. D. METRO SYSTEM {GALLONS}
	12/1/2007	0	117,800
	12/2/2007	0	68,900
	12/3/2007	0	74,000
	12/4/2007	0	76,200
	12/5/2007	0	146,100
	12/6/2007	0	34,100
	12/7/2007	0	41,000
	12/8/2007	0	75,200
	12/9/2007	0	52,200
	12/10/2007	0	53,800
	12/11/2007	0	184,400
	12/12/2007	0	107,200
	12/13/2007	0	101,100
	12/14/2007	0	105,600
	12/15/2007	0	102,400
	12/16/2007	0	84,700
	12/17/2007	0	83,000
	12/18/2007	0	85,600
	12/19/2007	0	113,300
	12/20/2007	0	132,500
	12/21/2007	0	61,700
	12/22/2007	0	94,800
	12/23/2007	0	89,700
	12/24/2007	0	88,900
	12/25/2007	0	68,400
	12/26/2007	0	12,700
	12/27/2007	0	27,400
	12/28/2007	0	39,300
	12/29/2007	0	48,000
	12/30/2007	0	65,400
	12/31/2007	0	66,500
	TOTAL FOR MONTH:	0	2,501,900

DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT ORDER NO.: 92-25

REPORT FOR: Saturday, December 01, 2 DUE DATE: 2/1/08 REPORT FREQUENCY: MONTHLY:

PLANT SUPERVISOR:

DATE	DRIED SLUDGE TO USE AREA (cu yds)	SCREENINGS TO METRO SYS. (cu yds)	SCRN/SLUDGE TO DRYING BEDS (cu yds)	SCRN/SLUDGE TO USE AREA (cu yds)
12/1/2007	0	2.4	0	0
12/2/2007	0	1.6	0	0
12/3/2007	0	2.0	0	0
12/4/2007	0	1.4	0	0
12/5/2007	0	1.6	0	0
12/6/2007	0	0.1	0	0
12/7/2007	0	1.5	0	0
12/8/2007	0	1.7	0	0
12/9/2007	0	1.8	0	0
12/10/2007	0	1.8	0	0
12/11/2007	0	2.1	0	0
12/12/2007	0	1.9	0	0
12/13/2007	0	2.2	0	0
12/14/2007	0	2.2	0	0
12/15/2007	0	2.2	0	0
12/16/2007	0	2.3	0	0
12/17/2007	0	2.4	0	0
12/18/2007	0	1.3	0	0
12/19/2007	0	2.6	0	0
12/20/2007	0	2.0	0	0
12/21/2007	0	0.7	0	0
12/22/2007	0	0.6	0	0
12/23/2007	0	0.6	0	0
12/24/2007	0	0.6	0	0
12/25/2007	0	0.3	0	0
12/26/2007	0	0.5	0	0
12/27/2007	0	0.8	0	0
12/28/2007	0	0.8	0	0
12/29/2007	0	1.3	0	0
12/30/2007	0	1.7	0	0
12/31/2007	0	1.8	0	0
TOTAL	**0**	**46.8**	**0**	**0**

...-Dedicated to Community Service
2554 SWEETWATER SPRINGS BOULEVARD, SPRING VALLEY, CALIFORNIA 91978-2004
TELEPHONE: 670-2222, AREA CODE 619
www.otaywater.gov

December 2007 Report

POTABLE @ 11901 Singer Lane

Sample Date/Time: December 3rd, 2007/0720

Constituent	Result	Units
TDS (Total Dissolved Solids)	459	mg/l
Chloride	89.5	mg/l
Sulfate	148	mg/l

RWCWRF Effluent

Sample Date/Time: December3rd, 2007/0700

Constituent	Result	Units
TDS (Total Dissolved Solids)	843	mg/l
Chloride	214	mg/l
Manganese	ND <0.002	mg/l
Sulfate	208	mg/l
Fluoride	0.26	mg/l
Iron	0.022	mg/l
Boron	0.44	mg/l
% Sodium	52.8	
MBAS	0.405	mg/l
Total Nitrogen as N	20.9	mg/l
Electroconductivity	1.36	dS/m

Prepared by A.P. Ortega 01/09/2008

A.P. Ortega

Note: QC data is kept in the original laboratory report (s).

DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT
REPORT FOR: Tuesday, March 06/07 **DUE DATE:** 2/1/08
EXACT SAMPLE POINT:: R.W.C.W.R.F. FACILITY/EFFLUENT
SAMPLE ANALYZED BY: ALMA ORTEGA-CARRILLO / J. SWIGGERS AND MONTGOMERY WATSON LABORATORY

ORDER NO.: 92-25
REPORT FREQUENCY: ANNUALLY
SAMPLE COLLECTED BY: Julie Wilson
SIGNED UNDER PENALTY OF PERJURY:

PARAMETER	DATE and TIME SAMPLE	FREQUENCY OF SAMPLE	UNITS	SAMPLE TYPE	SAMPLE VALUE
ALUMINUM	3/6/2007 8:00:00 AM	ANNUALLY	MG/L	24 HOUR COMPOSITE	0.35
ARSENIC	"	"	"	"	<0.001
BARIUM	"	"	"	"	0.081
CADMIUM	"	"	"	"	<0.50
CHROMIUM	"	"	"	"	0.0059
LEAD	"	"	"	"	<.0005
MERCURY	"	"	"	"	<.0002
SELENIUM	"	"	"	"	<0.005
SILVER	"	"	"	"	<.0005

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

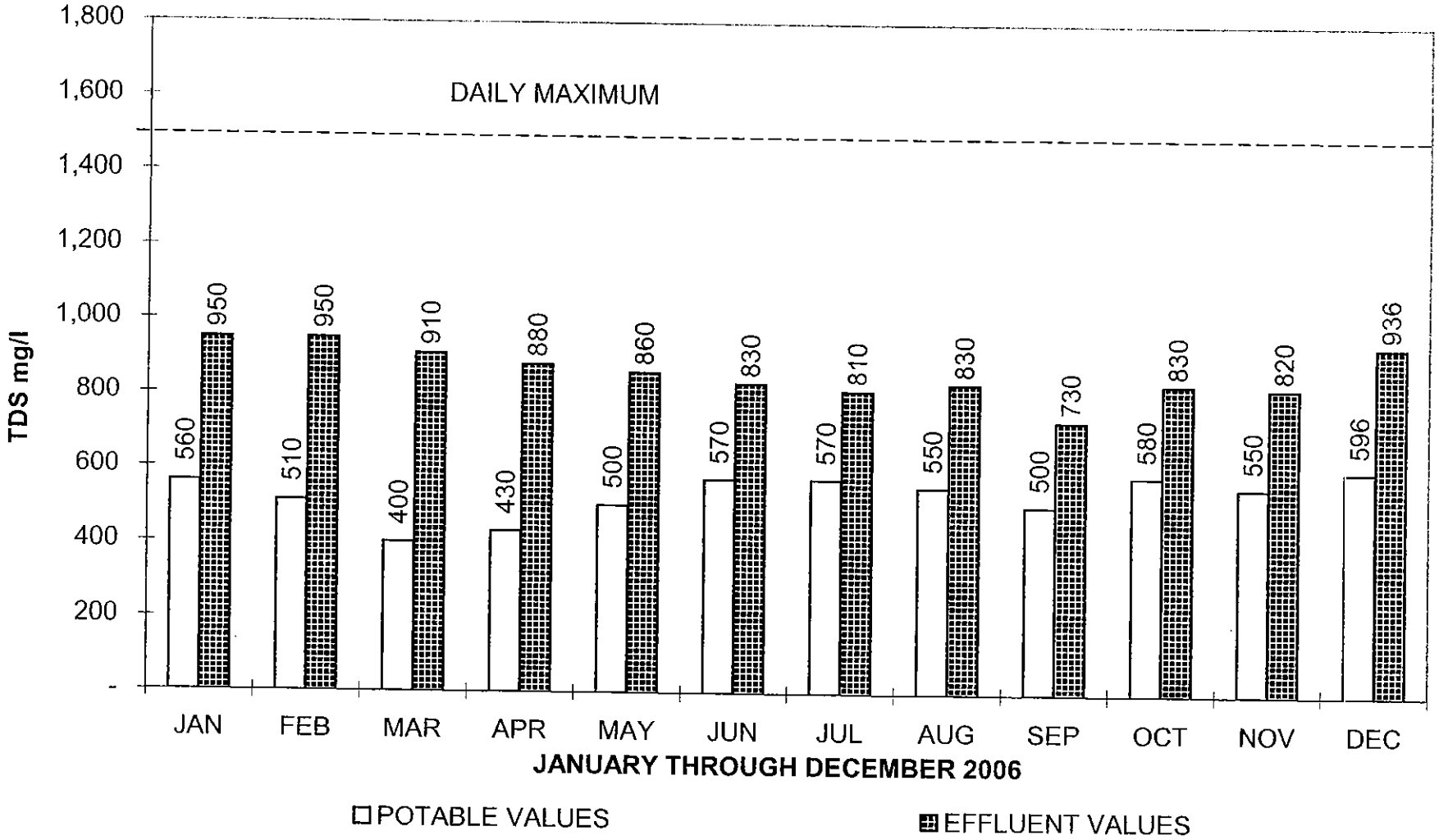
Laboratory
Data Report
#197887

Otay Water District
Julie Swiggers
2554 Sweetwater Springs Blvd.
Spring Valley , CA 91977

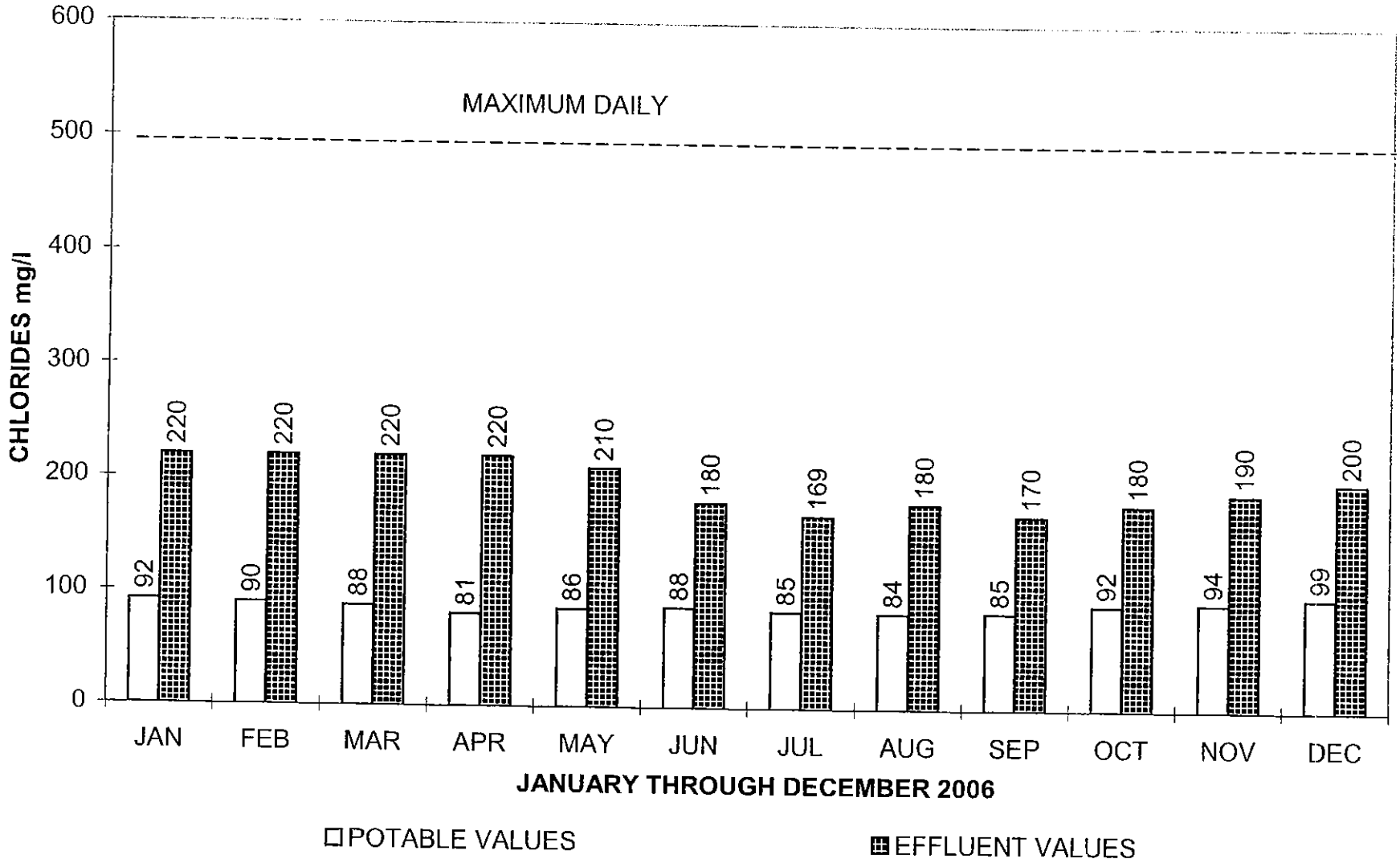
Samples Received
03/06/07

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
RWCWRF PLANT EFFLUENT (2703060584) Sampled on 03/06/07 08:00								
	03/09/07 13:54	356638	(ML/EPA 200.8)	Silver, Total, ICAP/MS	ND	ug/l	0.50	1
	03/09/07 00:00	357737	(ML/EPA 200.8)	Aluminum, Total, ICAP/MS	350	ug/l	20	1
	03/09/07 13:54	357493	(ML/EPA 200.8)	Arsenic, Total, ICAP/MS	1.2	ug/l	1.0	1
	03/09/07 12:54	356648	(ML/EPA 200.8)	Barium, Total, ICAP/MS	81	ug/l	2.0	1
	03/09/07 12:54	356642	(ML/EPA 200.8)	Cadmium, Total, ICAP/MS	ND	ug/l	0.50	1
	03/09/07 00:00	359345	(ML/EPA 200.8)	Chromium, Total, ICAP/MS	5.9	ug/l	1.0	1
	03/08/07 09:52		(EPA 200 Prep)	Metals digestion performed.	Y	Yes/No	0	1
	03/14/07 00:00	357181	(ML/EPA 245.1)	Mercury	ND	ug/l	0.20	1
	03/09/07 00:00	359354	(ML/EPA 200.8)	Nickel, Total, ICAP/MS	ND	ug/l	5.0	1
	03/09/07 13:54	356655	(ML/EPA 200.8)	Lead, Total, ICAP/MS	ND	ug/l	0.50	1
	03/09/07 13:54	356632	(ML/EPA 200.8)	Selenium, Total, ICAP/MS	ND	ug/l	5.0	1
	03/09/07 13:54	357490	(ML/EPA 200.8)	Zinc, Total, ICAP/MS	55	ug/l	5.0	1
11901 SINGER POTABLE (2703060585) Sampled on 03/06/07 08:00								
	03/07/07 12:56	356103	(ML/EPA 200.8)	Silver, Total, ICAP/MS	ND	ug/l	0.50	1
	03/07/07 12:56	356119	(ML/EPA 200.8)	Aluminum, Total, ICAP/MS	64	ug/l	20	1
	03/07/07 12:56	356097	(ML/EPA 200.8)	Arsenic, Total, ICAP/MS	ND	ug/l	1.0	1
	03/07/07 12:56	356110	(ML/EPA 200.8)	Barium, Total, ICAP/MS	110	ug/l	2.0	1
	03/07/07 12:56	356105	(ML/EPA 200.8)	Cadmium, Total, ICAP/MS	ND	ug/l	0.50	1
	03/07/07 12:56	356123	(ML/EPA 200.8)	Chromium, Total, ICAP/MS	ND	ug/l	1.0	1
	03/14/07 00:00	357181	(ML/EPA 245.1)	Mercury	ND	ug/l	0.20	1
	03/07/07 12:56	356089	(ML/EPA 200.8)	Nickel, Total, ICAP/MS	ND	ug/l	5.0	1
	03/07/07 12:56	356115	(ML/EPA 200.8)	Lead, Total, ICAP/MS	1.4	ug/l	0.50	1
	03/07/07 12:56	356099	(ML/EPA 200.8)	Selenium, Total, ICAP/MS	ND	ug/l	5.0	1
	03/07/07 12:56	356093	(ML/EPA 200.8)	Zinc, Total, ICAP/MS	23	ug/l	5.0	1

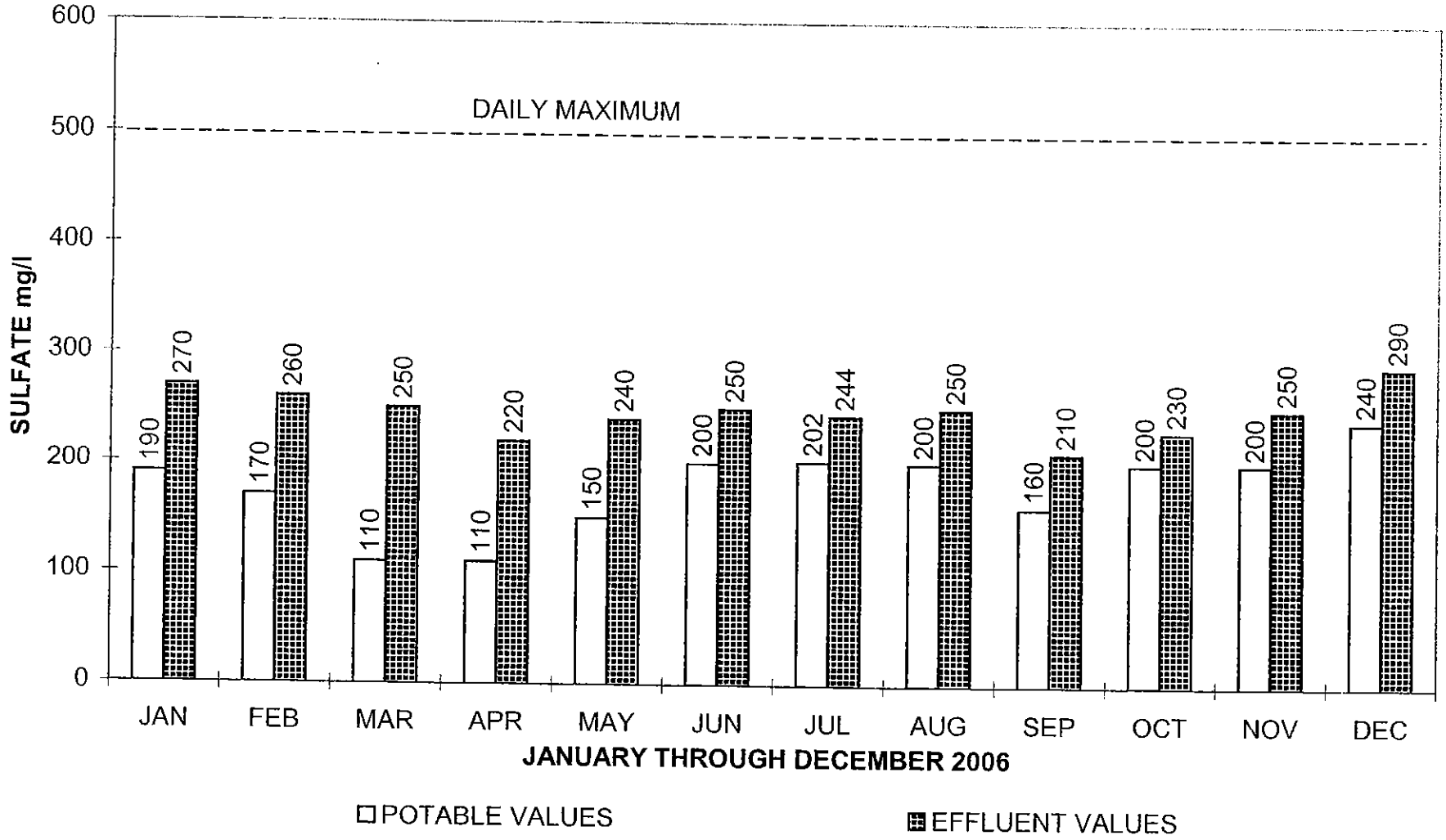
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
TDS



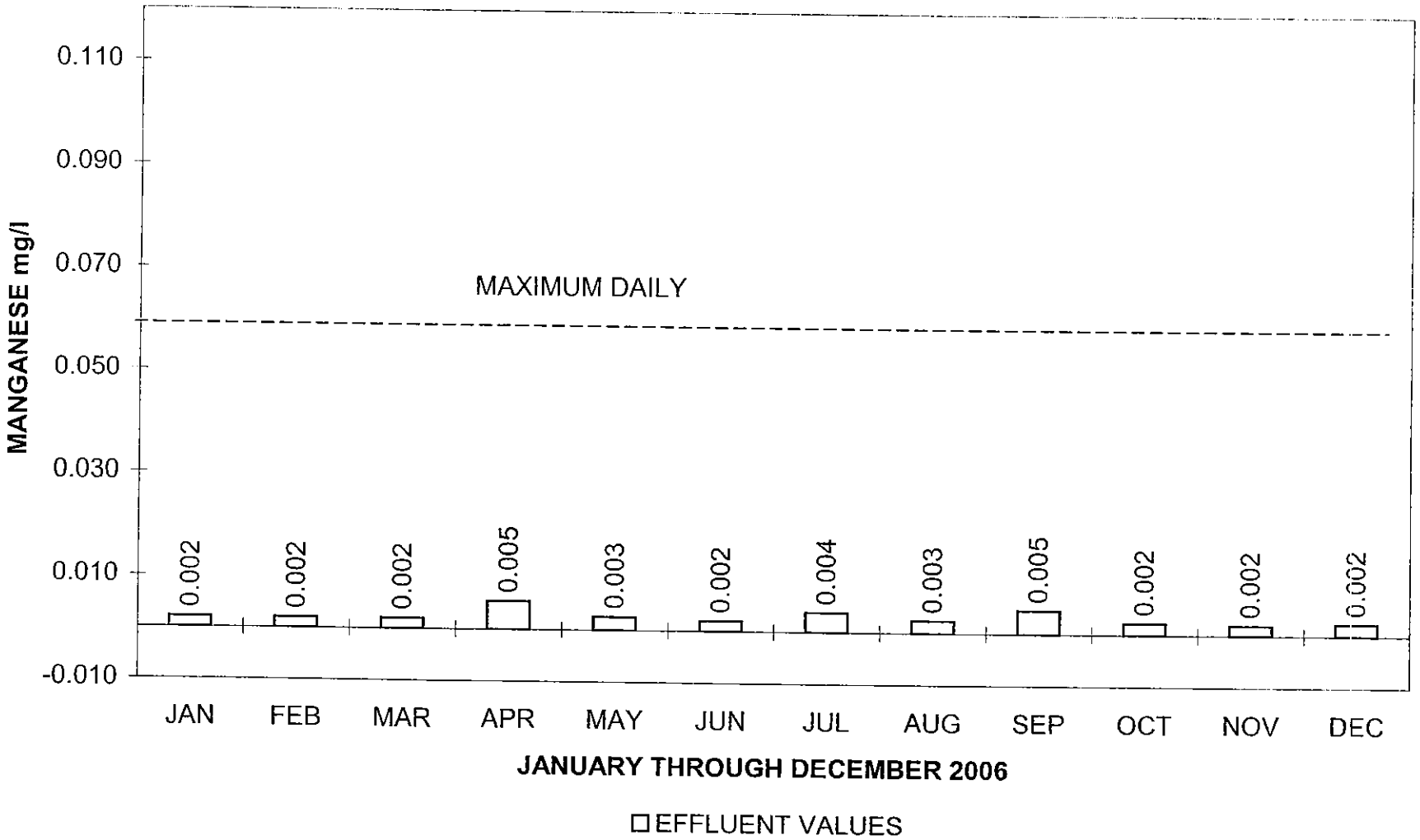
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
CHLORIDES



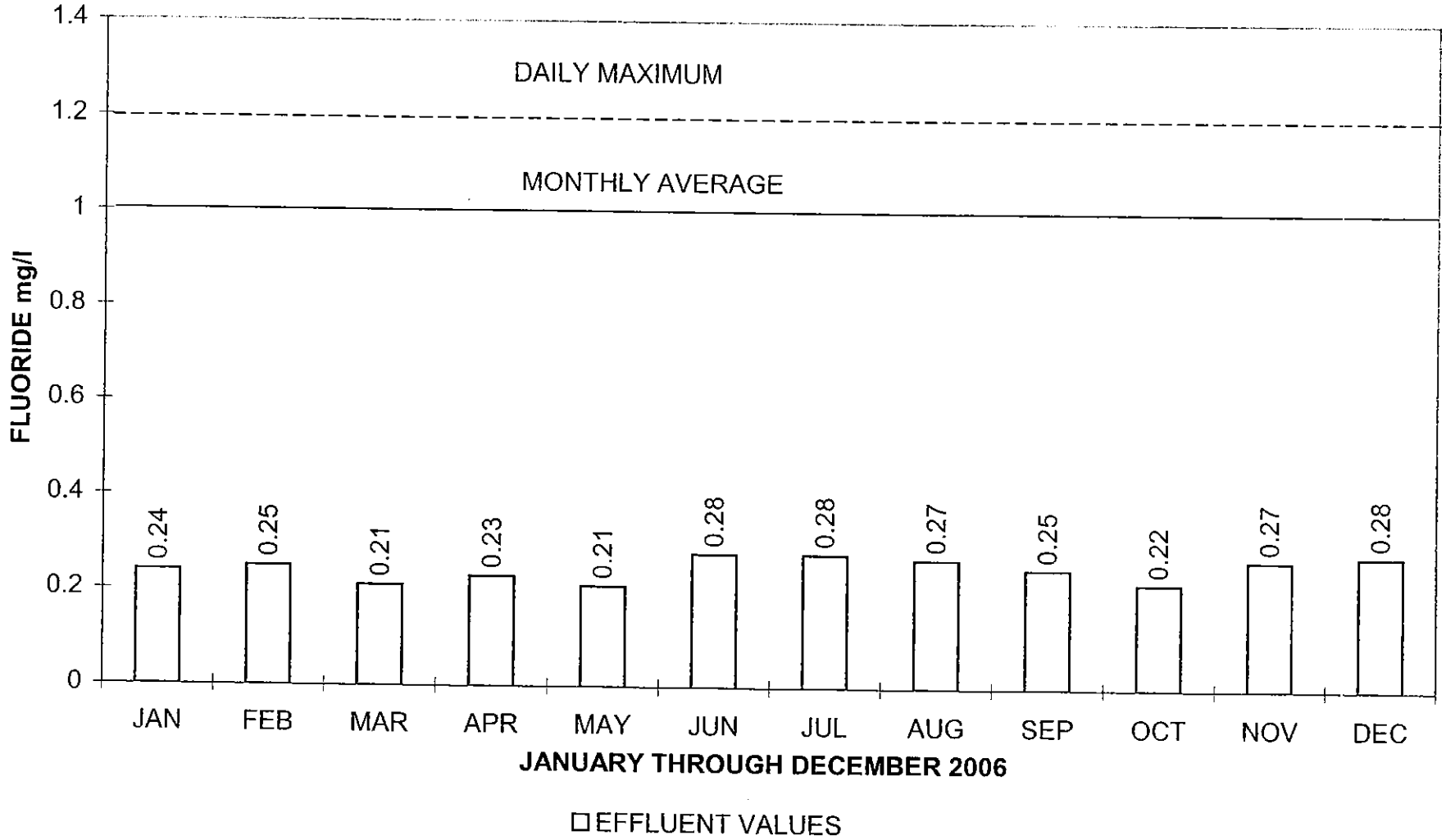
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
SULFATE



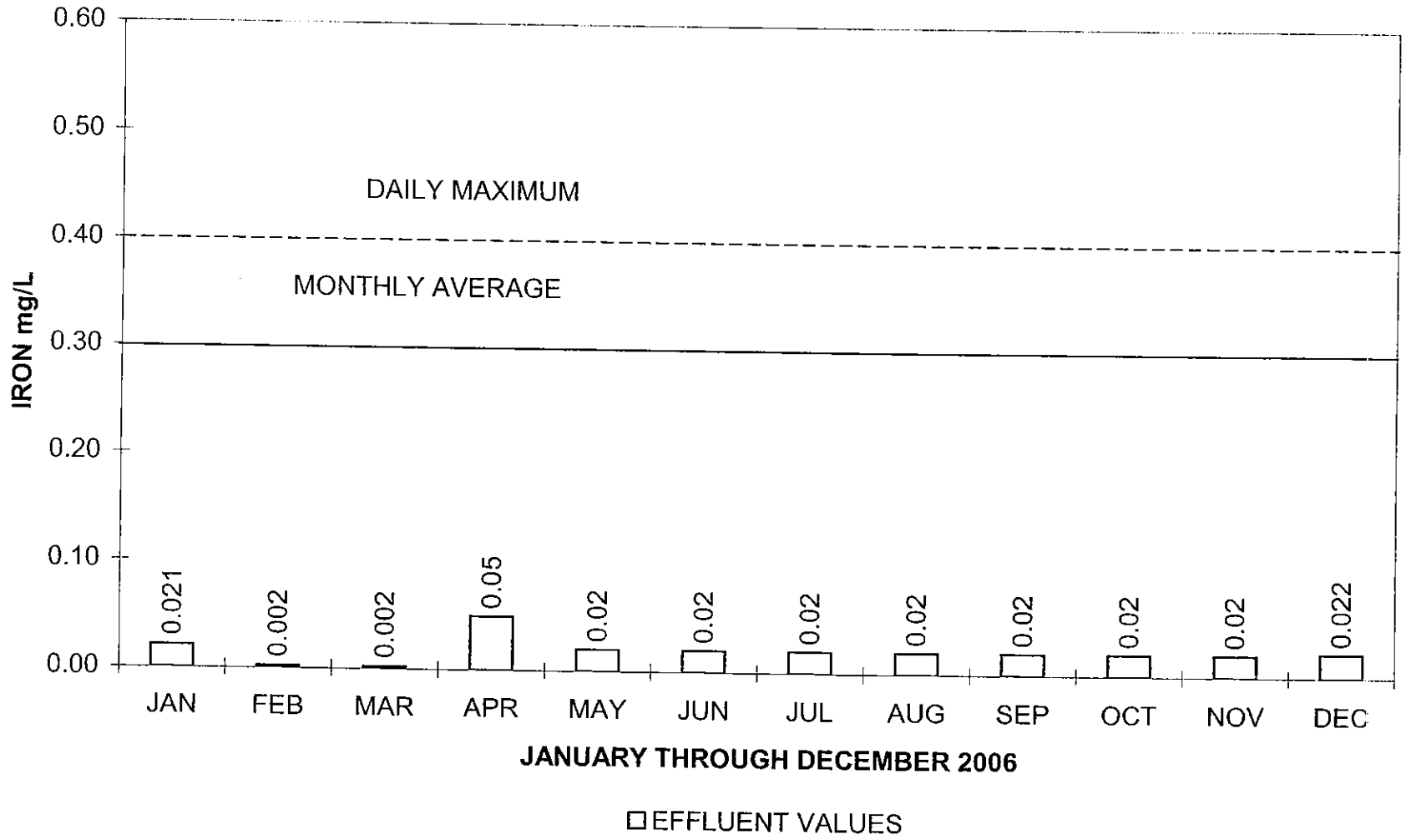
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
MANGANESE



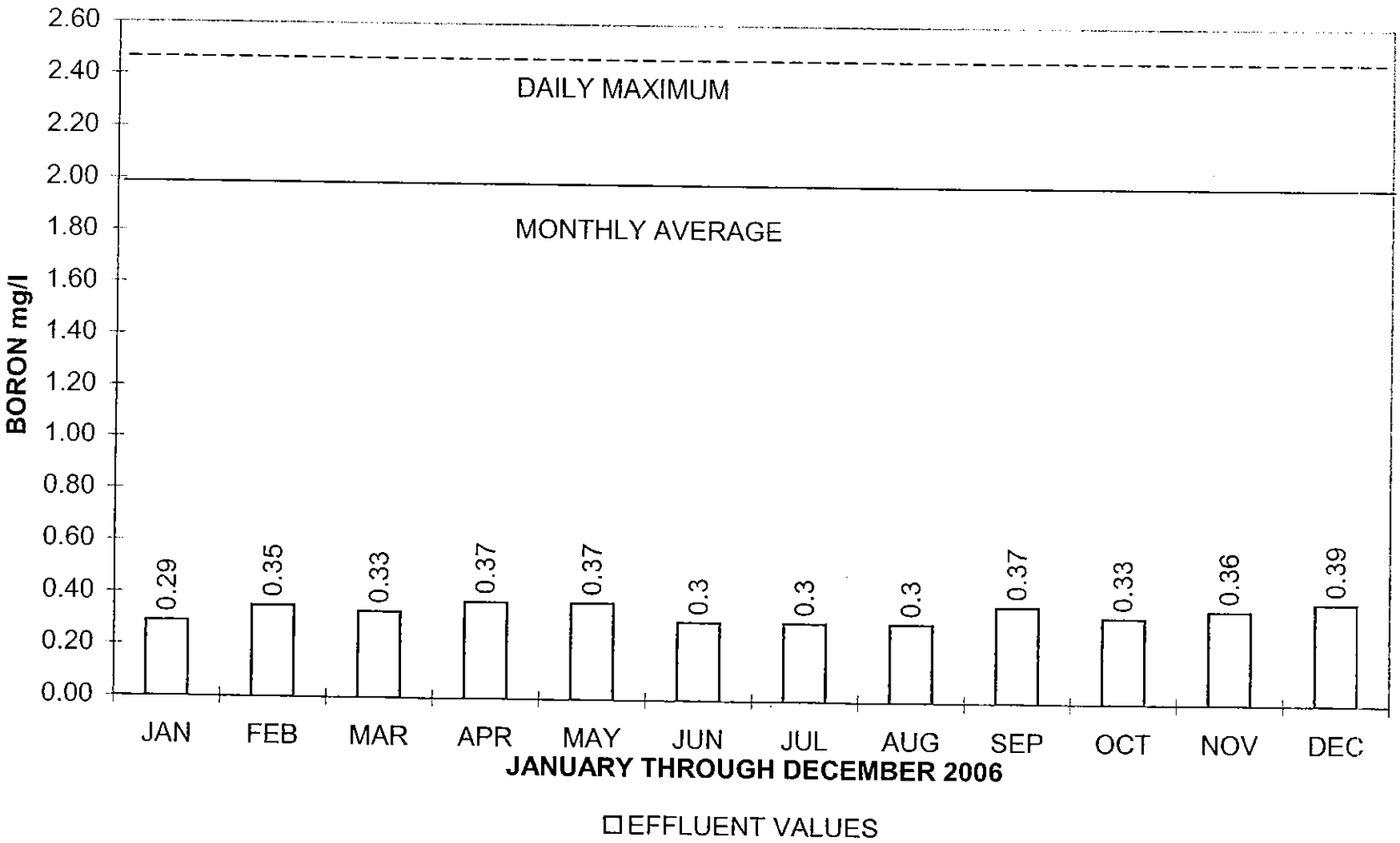
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
FLUORIDES



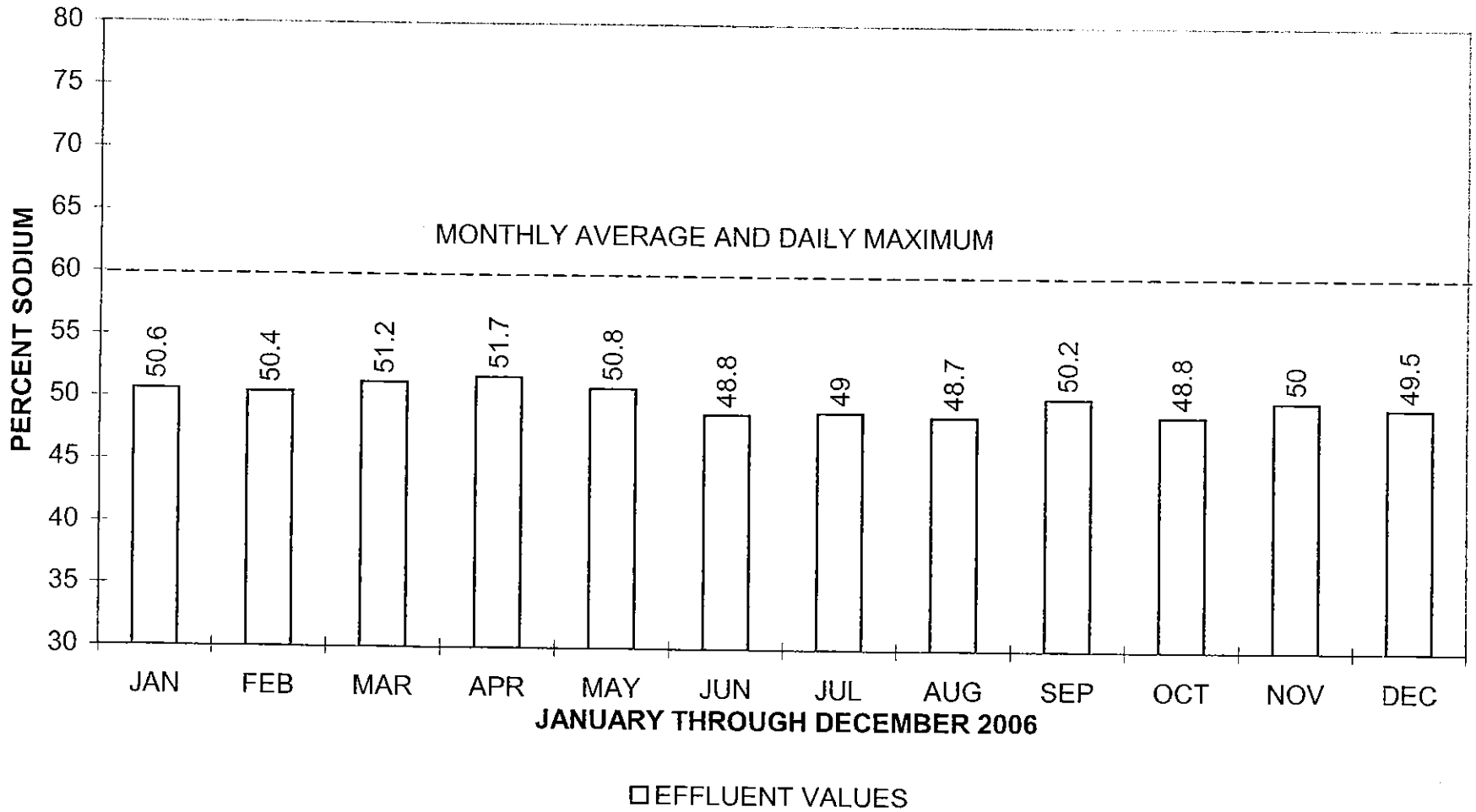
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
IRON



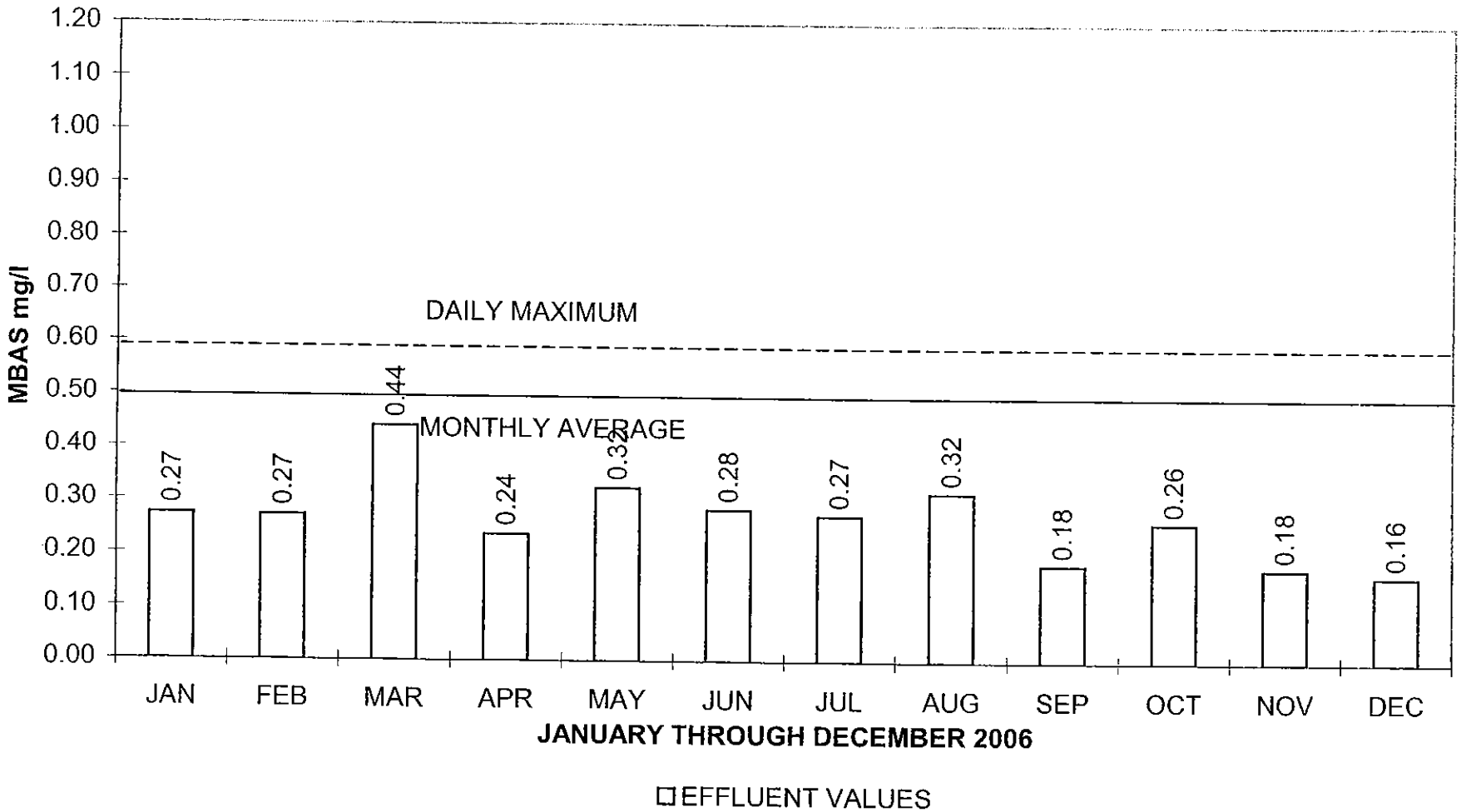
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
BORON



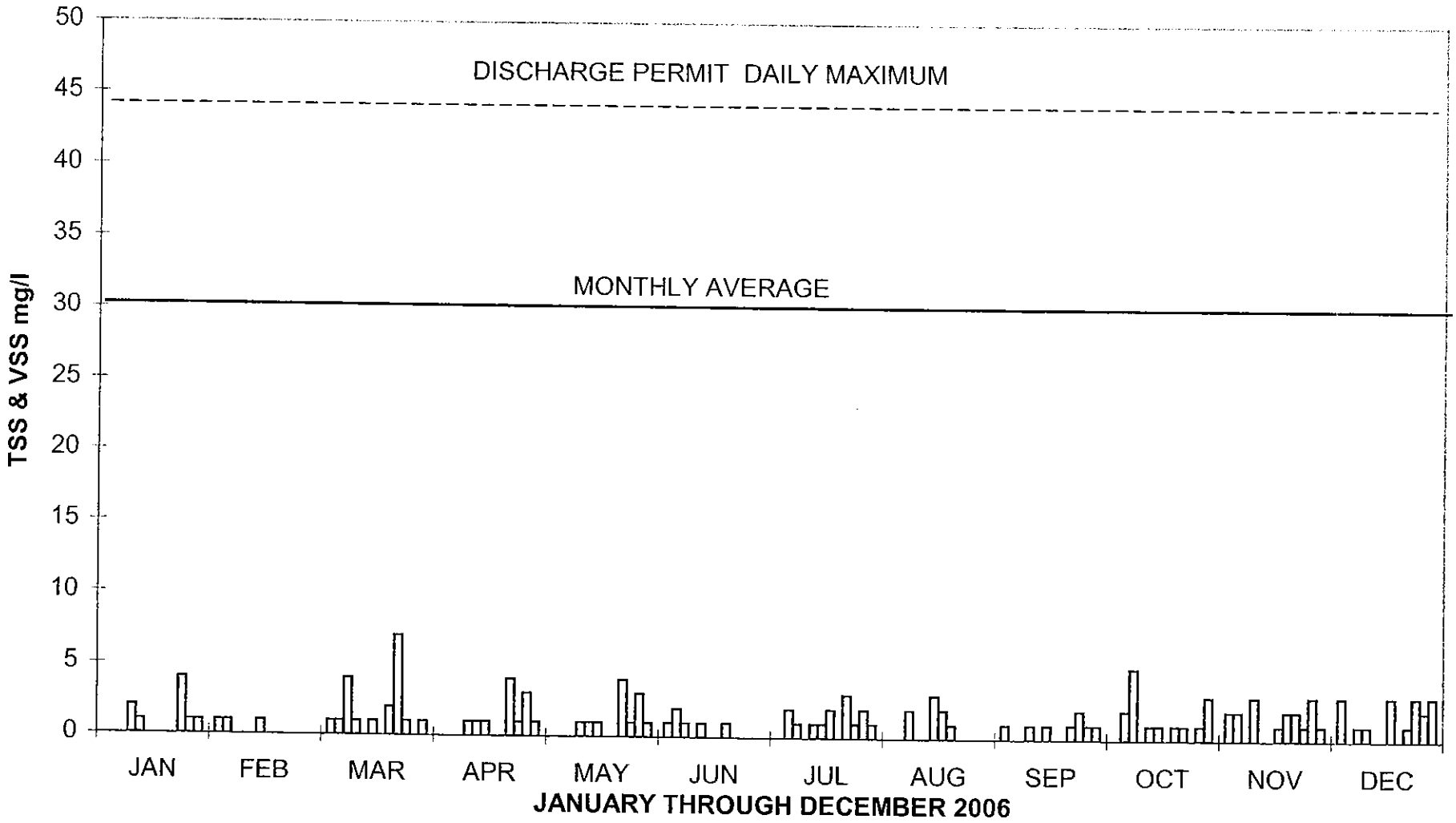
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
SODIUM



OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
MBAS

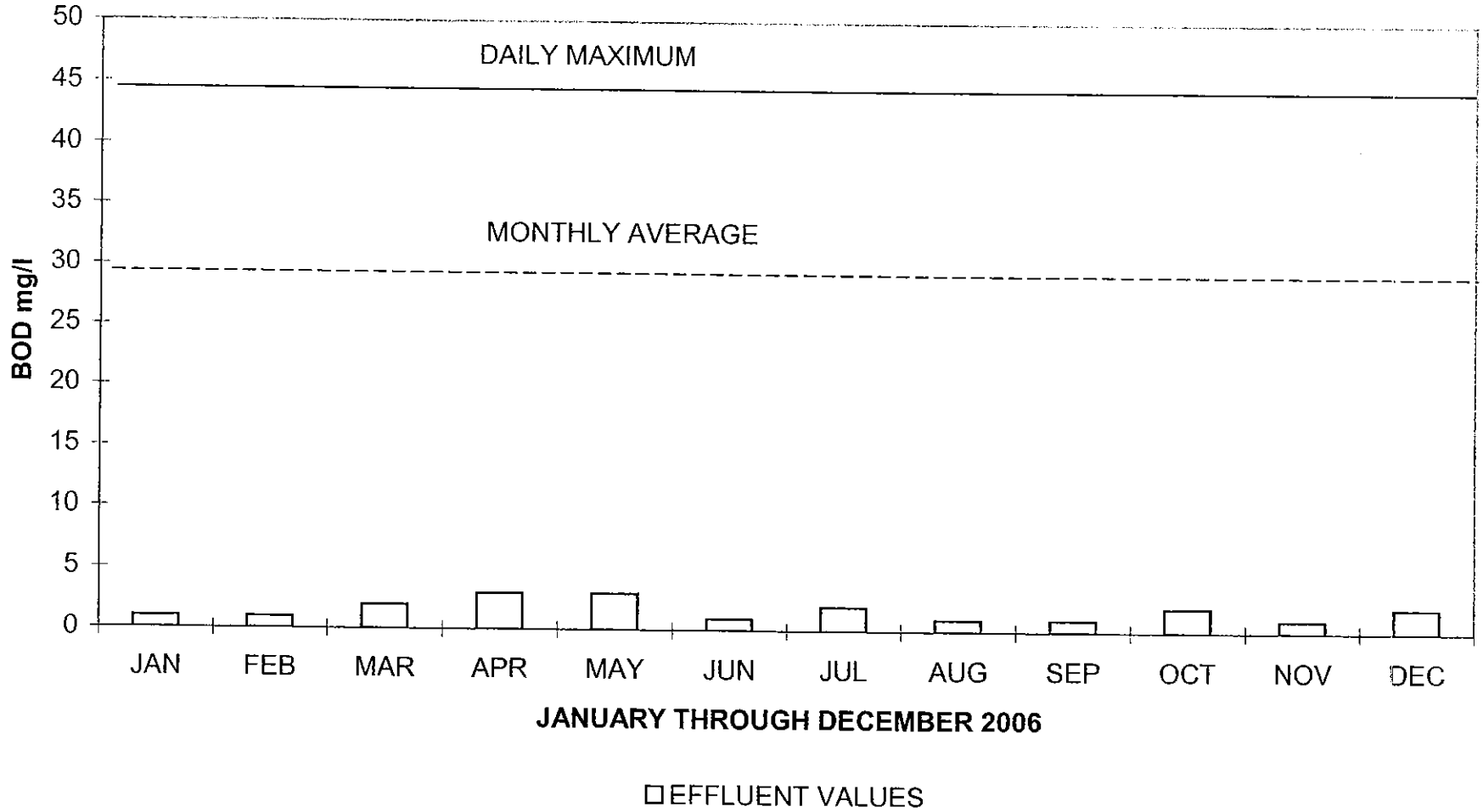


OTAYWATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
TSS & VSS

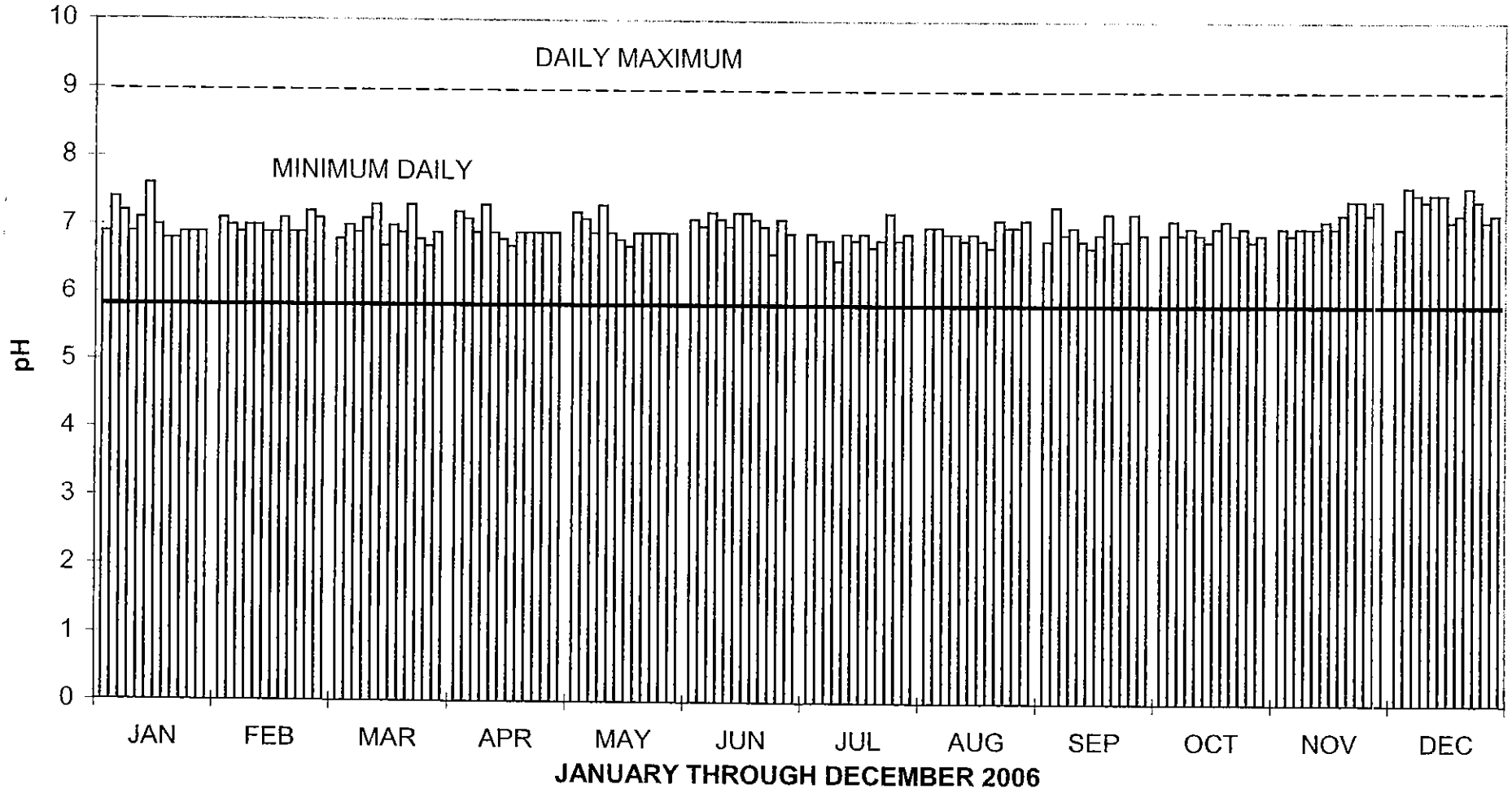


EFFLUENT VALUES

OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
BOD



OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
pH



EFFLUENT VALUES

RALPH W. CHAPMAN WATER RECYCLING FACILITY
MONTHLY EFFLUENT DATA SUMMARY 2007

ORDER NO.: R9-2007-0038

DATE	TDS	CL	Mn	SO4	F	Fe	B	3 PER WEEK pH						%Na	MBAS	3 PER WEEK BOD						3 PER WEEK TSS/VSS						P-TDS	P-Cl	P-SO4
1/10/2007	754	200	0.002	200	0.2	0.020	0.410	7.2	7.1	7.3	7.0	7.0	6.9	54	0.13	1	2	1	1	1	1	5	3	5	3	3	2	444	80	130
								7.0	6.8	6.8	6.7	6.9	6.8			1	1	1	1	1	1	3	2	3	3	2	3			
2/8/2007	896	240	3.900	260	0.2	0.021	0.370	6.8	6.7	6.5	6.5	6.7	6.9	50	0.13	2	2	2	2	2	2	2	2	2	2	4	3	522	89	170
								6.4	6.9	7.0	6.8	6.8	6.7			2	2	2	2	2	2	2	5	4	3	4	8			
3/6/2007	1040	270	0.250	310	0.2	0.047	0.430	6.7	6.8	6.1	6.7	6.7	6.4	50	0.19	2	2	6	2	2	2	4	5	3	2	6	2	602	94	210
								0.0	6.4	6.9	7.5	7.8	7.4			0	2	2	2	3	2	0	0	1	2	2	1			
4/11/2007	750	200	0.002	230	0.2	0.022	0.370	7.3	7.0	4.4	6.2	6.9	6.8	50	0.24	2	2	2	2	2	2	3	5	1	2	2	1	470	93	160
								7.0	7.2	7.1	7.0	7.2	7.4			2	2	2	2	2	2	2	5	1	0	3	3			
5/3/2007	806	194	0.002	240	0.2	0.020	0.350	7.4	7.4	7.2	7.2	7.2	7.1	51	0.22	2	2	2	2	2	2	1	5	1	2	6	1	534	94	180
								7.3	7.4	7.1	7.3	7.2	7.3			2	2	2	2	2	2	1	4	1	3	4	2			
6/7/2007	964	220	0.003	240	0.2	0.036	0.430	7.2	7.7	7.1	7.3			50	0.29	2	2	2	2			2	2	6	3			566	91	170
7/10/2007	964	200	0.004	230	0.3	0.022	0.410	7.2	7.3	7.1	7.3			50	0.24	2	2	2	2			0	0	1	1			572	92	180
8/8/2007	848	210	0.003	220	0.2	0.025	0.390	6.7	6.8	6.9	7.0			52	0.35	2	2	2	2			1	1	1	1			496	89	160
9/13/2007	910	220	0.002	260	0.3	0.020	0.390	6.5	6.8	6.9	6.7			50	0.20	2	2	2	2			1	0	2	1			566	98	210
10/3/2007	856	220	0.005	220	0.3	0.036	0.390	6.8	6.8	6.6	6.9			52	0.15	2	2	2	2			1	1	1	1			530	94	170
11/14/2007	820	208	0.004	201	0.3	0.032	0.410	6.6	6.7	7.0	6.7			53	0.17	2	2	2	2			1	2	2	1			532	91	150
12/3/2007	843	214	0.002	208	0.3	0.022	0.440	6.7	6.9	6.8	6.6			53	0.41	2	2	2	2			1	1	1	1			459	90	148

REPORT AS OF: 3/10/2008

...Dedicated to Community Service
2554 SWEETWATER SPRINGS BOULEVARD, SPRING VALLEY, CALIFORNIA 91978-2004
TELEPHONE: 670-2222, AREA CODE 619
www.otaywater.gov

February 12, 2009

Mr. John Robertus
Executive Officer
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, Ca. 92123-4340

Dear Mr. Robertus:

Enclosed is the 2008 Annual Report for the Otay Water District's Ralph W. Chapman Water Recycling Facility. Graphical and tabular summaries for all of the previous year's monitored constituents are included for your review.

The twelve month running average limitation for Total Nitrogen from January through December 2008 is 17.24 mg/L. The result for nitrate as NO_3 in the annual report is higher than the MCL for potable water. The District has hired a consultant to provide us with a comprehensive analysis of our plant operations and equipment needs. We are expecting to receive a summary of recommendations from the firm in March. The District is beginning a capital improvement project to resolve the high Nitrogen and Nitrate levels.

The Ralph W. Chapman Water Recycling Facility supplies full Title 22 disinfected tertiary recycled water for spray irrigation of parkways, streetscape, neighborhood parks and common slopes within the Rancho Del Rey, Otay Ranch, Sunbow, Eastlake, Rolling Hills Ranch and Duncan Ranch communities.

If you have any questions regarding these summaries or the operation of our reclamation facility, please call me at (619) 670-2271 at your earliest convenience.

Cordially,

Dale Kreinbring
Treatment Plant Supervisor

...Dedicated to Community Service
2554 SWEETWATER SPRINGS BOULEVARD, SPRING VALLEY, CALIFORNIA 91978-2004
TELEPHONE: 670-2222, AREA CODE 619
www.otaywater.gov

January 20, 2009

Annual Discharge Report, 2008

Otay Water District
Ralph W. Chapman Water Recycling Facility

SCR: 251548: MVALD
ORDER NO. R9-2007-0038; MASTER RECLAMATION PERMIT
WDID No. 9 000000217

Certification Statement

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Gary Stalker

Gary Stalker
System Operations Manager
Otay Water District
2554 Sweetwater Springs Blvd.
Spring Valley, CA 91978-2096
(619) 670-2228

Dale Kreinbring

Dale Kreinbring
Reclamation Plant Supervisor
Otay Water District
2554 Sweetwater Springs Blvd.
Spring Valley, CA 91978-2096
(619) 670-2271

DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT
REPORT FOR: Wednesday, Octo DUE DATE: 2/1/09
EXACT SAMPLE POINT:: R.W.C.W.R.F. FACILITY/EFFLUENT
SAMPLE ANALYZED BY: ALMA ORTEGA-CARRILLO / J. SWIGGERS AND MONTGOMERY WATSON LABORATORY

ORDER NO.: 92-25
REPORT FREQUENCY: ANNUALLY
SAMPLE COLLECTED BY: Julie Wilson

SIGNED UNDER PENALTY OF PERJURY:

PARAMETER	DATE and TIME SAMPLE	FREQUENCY OF SAMPLE	UNITS	SAMPLE TYPE	SAMPLE VALUE
ALUMINUM	10/8/2008 8:30:00 AM	ANNUALLY	MG/L	24 HOUR COMPOSITE	0.047
ARSENIC	"	"	"	"	0.0011
BARIUM	"	"	"	"	0.086
CADMIUM	"	"	"	"	<.0005
CHROMIUM	"	"	"	"	0.0028
LEAD	"	"	"	"	.00069
MERCURY	"	"	"	"	<.0002
SELENIUM	"	"	"	"	<0.005
SILVER	"	"	"	"	<.0005

REPORT FOR: Wednesday, December 03, DUE DATE: 2/1/09
EXACT SAMPLE POINT:: R.W.C.W.R.F. FACILITY/EFFLUENT
SAMPLE ANALYZED BY: ALMA ORTEGA-CARRILLO/ J. SWIGGERS AND MONTGOMERY WATSON LABORATORY

ORDER NO.: 92-25
REPORT FREQUENCY: MONTHLY
SAMPLE COLLECTED BY: Julie Wilson

SIGNED UNDER PENALTY OF PERJURY

PARAMETER	DATE and TIME SAMPLE		FREQUENCY OF SAMPLE	UNITS	SAMPLE TYPE		SAMPLE VALUE				DAILY MAX. LIMITATION	MONTHLY AVG. LIMITATION
TOTAL DISOLVED SOLIDS	12/3/2008	06:30	MONTHLY	MG/L	24 HOUR COMPOSITE		927				1600	1376
CHLORIDES	12/3/2008	06:30	"	"	"		217				532	440
MANGANESE	12/3/2008	06:30	"	"	"	<	0.002				0.09	0.03
SULFATE	12/3/2008	06:30	"	"	"		245				540	451
FLUORIDE	12/3/2008	06:30	"	"	"		0.630				1.2	0.8
IRON	12/3/2008	06:30	"	"	"	<	0.020				0.6	0.2
BORON	12/3/2008	06:30	"	"	"		0.410				0.8	0.7
PERCENT SODIUM	12/3/2008	06:30	"	%	"		50				61	59
MBAS	12/3/2008	06:30	"	MG/L	"		0.242				0.7	0.3
TOTAL NITROGEN (as N)	12/3/2008	06:30	"	"	"		15.1				22	9.4
ELECTRO-CONDUCTIVITY	12/3/2008	06:30	"	dS/m	"		1.48				N/A	N/A
pH	12/3/2008	06:30	WEEKLY	pH	GRAB	6.7	7.1	6.9	6.8		6-9	
BIOCHEMICAL OXYGEN DEMAND	1,8,15,23		"	MG/L	"	3	2	2	2		7-day average 45	30-day average 30
SUSPENDED SOLIDS TOTAL	1,8,15,23		"	"	"	1	1	1	1		45	30
SUSPENDED SOLIDS VOLATILE	1,8,15,23		"	"	"	1	1	1	1			

SAMPLE POINT:: R.W.C.W.R.F. FACILITY/EFFLUENT DUE DATE: 2/1/09 RECYCLING FACILIT

SAMPLE ANALYZED BY: ALMA ORTEGA-CARRILLO / J.SWIGGERS AND MONTGOMERY WATSON LABORATORY

ORDER NO.: 92-25
REPORT FREQUENCY: MONTHLY
SAMPLE COLLECTED BY: Julie Wilson

SIGNED UNDER PENALTY OF PERJURY:

PARAMETER	DATE and TIME SAMPLE	FREQUENCY OF SAMPLE	UNITS	POTABLE SAMPLE VALUE WATER SUPPLY	REQUIRED 30 DAY AVERAGE	DAILY MAX. LIMITATION	SAMPLE VALUE EFFLUENT
TOTAL DISOLVED SOLIDS	12/3/2008 06:30	MONTHLY	MG/L	563	400{1}a MG/L	450{1}b MG/L	927
CHLORIDES	12/3/2008 06:30	"	"	94	200{2}a MG/L	250{2}b MG/L	217
SULFATE	12/3/2008 06:30	"	"	190	100{3}a MG/L	150{3}b MG/L	245

{1} a. This is a 12-month running average maximum increment of TDS in effluent over potable water supply
b. This is a daily maximum increment of TDS in effluent over potable water suply
c. The daily maximum of TDS in effluent shall not exceed 1,600 mg/L
d. The 12-month running average of TDS in effluent shall not exceed 1376 mg/L
{2} a. This is a 12-month running average maximum increment of Chlorides in effluent over potable water supply
b. This is a daily maximum increment of Chlorides in effluent over potable water supply
c. The daily maximum of Chlorides in effluent shall not exceed 552 mg/L
d. The 12-month running average of Chlorides in effluent shall not exceed 440 mg/L
{3} a. This is a 12-month running average maximum increment of Sulfate in effluent over potable water supply
b. This is a daily maximum increment of Sulfate in effluent over potable water supply
c. The daily maximum of Sulfate in effluent shall not exceed 540 mg/L
d. The 12-month running average of Sulfate in effluent shall not exceed 451 mg/L (pg.12)

MONTHLY EFFLUENT MONITORING REPORT
DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT

ORDER 92-25

PLANT SUPERVISOR: [illegible] MONTH/YEAR: Monday, December 01, 20 DUE: 2/1/09

DATE	TREATMENT PLANT FLOW DAILY MGD	EFFLUENT DISOLVED OXYGEN DAILY mg/l	TURBIDITY CONTINUOUS DAILY NTU	COLIFORM DAILY MPN/100 ml.	COLIFORM 7 DAY MEDIAN MPN/100 ml.
12/1/2008	0.8883	7.0	1.20	<2	—
12/2/2008	0.8288	6.9	1.30	<2	—
12/3/2008	0.7784	7.1	1.20	<2	—
12/4/2008	0.907	7.3	0.80	<2	—
12/5/2008	1.0234	7.6	0.90	<2	—
12/6/2008	0.9401	7.8	1.30	<2	—
12/7/2008	1.0226	7.5	1.00	<2	—
12/8/2008	0.8855	7.9	1.00	<2	—
12/9/2008	1.0882	7.5	1.00	<2	—
12/10/2008	1.2604	7.8	0.90	<2	—
12/11/2008	1.1546	7.3	0.80	<2	—
12/12/2008	1.2874	7.6	0.80	<2	—
12/13/2008	1.2673	7.5	0.90	<2	—
12/14/2008	1.227	7.5	0.90	<2	—
12/15/2008	1.1678	7.7	1.00	<2	—
12/16/2008	1.3075	7.9	0.90	<2	—
12/17/2008	1.2687	7.5	0.90	<2	—
12/18/2008	1.0941	7.7	0.80	<2	—
12/19/2008	0.6377	8.2	0.90	<2	—
12/20/2008	0.4472	9.3	1.00	<2	—
12/21/2008	0.4616	7.6	1.00	<2	—
12/22/2008	0.4229	7.9	1.00	<2	—
12/23/2008	0.5084	8.2	1.20	<2	—
12/24/2008	0.577	9.4	1.10	<2	—
12/25/2008	0.5272	12.1	1.20	<2	—
12/26/2008	0.5216	8.6	1.30	<2	—
12/27/2008	0.5067	8.5	1.00	<2	—
12/28/2008	0.7114	8.7	0.80	<2	—
12/29/2008	0.5043	8.4	0.80	<2	—
12/30/2008	0.4779	9.2	1.00	<2	—
TOTAL	25.70				
AVERAGE	0.86	8.0	1.00		

Plant was off line on 12/31/08

(1) The median number of coliform organisms shall not exceed 2.2/100ml.
(2) The number of coliform organisms shall not exceed 23/100ml.
(3) Effluent turbidity must not exceed 5 NTU more than 5% of the time during any 24hour period.

DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT

REPORT FOR: Monday, December 01, DUE DATE: 2/1/09

REPORT FREQUENCY: MONTHLY:

ORDER NO.: 92-25

PLANT SUPERVISOR: [signature]

PARAMETER W. A. S.	DATE	VOLUME TO SLUDGE BEDS (GALLONS)	VOLUME TO S. D. METRO SYSTEM (GALLONS)
	12/1/2008	0	77,300
	12/2/2008	0	87,800
	12/3/2008	0	92,000
	12/4/2008	0	80,200
	12/5/2008	0	94,600
	12/6/2008	0	89,100
	12/7/2008	0	90,800
	12/8/2008	0	74,500
	12/9/2008	0	77,200
	12/10/2008	0	79,400
	12/11/2008	0	82,600
	12/12/2008	0	86,400
	12/13/2008	0	76,300
	12/14/2008	0	85,200
	12/15/2008	0	66,800
	12/16/2008	0	76,500
	12/17/2008	0	77,700
	12/18/2008	0	73,100
	12/19/2008	0	76,700
	12/20/2008	0	46,900
	12/21/2008	0	49,800
	12/22/2008	0	61,900
	12/23/2008	0	67,400
	12/24/2008	0	65,900
	12/25/2008	0	36,200
	12/26/2008	0	40,500
	12/27/2008	0	45,700
	12/28/2008	0	60,400
	12/29/2008	0	63,300
	12/30/2008	0	86,900
	TOTAL FOR MONTH:	0	2,169,100

Plant was off line on 12/31/08

DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT ORDER NO.: 92-25

REPORT FOR: Monday, December 01, 2 DUE DATE: 2/1/09 REPORT FREQUENCY: MONTHLY:

PLANT SUPERVISOR:

DATE	DRIED SLUDGE TO USE AREA (cu yds)	SCREENINGS TO METRO SYS. (cu yds)	SCRN/SLUDGE TO DRYING BEDS (cu yds)	SCRN/SLUDGE TO USE AREA (cu yds)
12/1/2008	0	1.6	0	0
12/2/2008	0	1.5	0	0
12/3/2008	0	1.4	0	0
12/4/2008	0	1.6	0	0
12/5/2008	0	1.9	0	0
12/6/2008	0	1.7	0	0
12/7/2008	0	1.9	0	0
12/8/2008	0	1.6	0	0
12/9/2008	0	2.0	0	0
12/10/2008	0	1.2	0	0
12/11/2008	0	2.2	0	0
12/12/2008	0	2.4	0	0
12/13/2008	0	2.4	0	0
12/14/2008	0	2.3	0	0
12/15/2008	0	2.2	0	0
12/16/2008	0	2.5	0	0
12/17/2008	0	2.4	0	0
12/18/2008	0	2.0	0	0
12/19/2008	0	1.1	0	0
12/20/2008	0	0.8	0	0
12/21/2008	0	0.8	0	0
12/22/2008	0	0.7	0	0
12/23/2008	0	0.9	0	0
12/24/2008	0	1.0	0	0
12/25/2008	0	0.9	0	0
12/26/2008	0	0.9	0	0
12/27/2008	0	0.9	0	0
12/28/2008	0	1.3	0	0
12/29/2008	0	0.9	0	0
12/30/2008	0	0.8	0	0
TOTAL	0	45.8	0	0

...Dedicated to Community Service
2554 SWEETWATER SPRINGS BOULEVARD, SPRING VALLEY, CALIFORNIA 91978-2004
TELEPHONE: 670-2222, AREA CODE 619
www.otaywater.gov

December 2008 Report

POTABLE @ 11901 Singer Lane
Sample Date/Time: December 3rd, 2008/0630

Constituent	Result	Units
TDS (Total Dissolved Solids)	563	mg/l
Chloride	94.2	mg/l
Sulfate	190	mg/l

RWCWRF Effluent
Sample Date/Time: December 3rd, 2008/0645

Constituent	Result	Units
TDS (Total Dissolved Solids)	927	mg/l
Chloride	217	mg/l
Manganese	ND<0.002	mg/l
Sulfate	245	mg/l
Fluoride	0.63	mg/l
Iron	ND<0.020	mg/l
Boron	0.41	mg/l
% Sodium	50.2	
MBAS	0.242	mg/l
Total Nitrogen as N	15.1	mg/l
Electroconductivity	1.48	dS/m

Prepared by A.P. Ortega 01/15/09
APOrtega

Note: QC data is kept in the original laboratory report (s).

Dale Kreinbring

From: Ngo, Michael [Michael.Ngo@sdcounty.ca.gov]
Sent: Thursday, January 15, 2009 12:02 PM
To: Dale Kreinbring
Subject: RE: Rancho San Diego EDU's

Dale,

There were no additional EDU's for the month of November and December 2008.

Thank you,

Michael Ngo
Wastewater Management
County of San Diego
858.694.2663

From: Dale Kreinbring [mailto:DKreinbring@otaywater.gov]
Sent: Thursday, January 15, 2009 11:50 AM
To: Ngo, Michael
Subject: RE: Rancho San Diego EDU's

Hello Michael,

Were there any new sewer connections in the months of November and December 2008?

Dale

From: Ngo, Michael [mailto:Michael.Ngo@sdcounty.ca.gov]
Sent: Wednesday, November 05, 2008 9:43 AM
To: Dale Kreinbring
Cc: Conde, Louis
Subject: Rancho San Diego EDU's

Dale,

There are no Rancho San Diego EDU's for the month of October 2008.

Thank you,

Michael Ngo
Wastewater Management
County of San Diego
858.694.2663

OTAY WATER DISTRICT - Ralph W. Chapman Water Recycling Facility
DISCHARGE ORDER No. R9-2007-0038
WDID No. 9 000000217 SCR: 251548: MVALD
DISCHARGE REPORT FOR (Dec / 2008)
Main Chlorine and Turbidity Monthly Report

DATE	TURBIDITY (NTU) Avg	TURBIDITY (NTU) Max	CHLORINE CONTACT TIME Avg (mg-min/L)	CHLORINE CONTACT TIME Min (mg-min/L)	CHLORINE RESIDUAL Avg (mg/L)	CHLORINE RESIDUAL Min (mg/L)	COMMENTS OR NOTES
1	1.307	1.539	6820	2829	26.072	15.200	
2	1.086	1.258	4535	1625	17.764	12.500	
3	0.860	1.047	4389	0	19.079	14.700	
4	0.834	1.086	3906	1776	19.231	14.800	
5	1.166	1.375	3779	2017	17.748	12.600	
6	0.916	1.076	4018	2213	19.186	0.000	
7	0.885	1.008	4159	2300	19.845	16.000	
8	1.001	1.109	4011	1831	20.175	15.700	
9	1.124	1.289	3669	0	19.446	0.000	
10	1.042	1.375	3833	0	19.865	14.400	
11	1.000	1.289	3666	1711	19.246	0.000	
12	1.099	1.586	3684	1577	19.481	14.200	
13	1.118	1.273	3946	1980	20.046	14.100	
14	1.008	1.125	4057	2147	20.221	15.300	
15	1.080	1.328	4075	1850	22.313	16.500	
16	1.006	1.156	4514	1925	23.231	0.000	
17	0.927	1.203	4219	0	19.990	13.900	
18	0.799	1.023	5826	2256	22.359	15.000	
19	1.002	1.195	12574	2222	19.542	12.100	
20	1.148	1.313	79597	2400	15.892	10.400	
21	1.141	1.305	52408	2445	17.565	10.400	
22	1.150	1.508	62510	1521	17.111	8.000	
23	1.142	1.367	11311	1917	20.709	9.800	
24	1.316	1.469	12743	2065	23.816	10.800	
25	1.434	1.609	6984	3600	25.822	17.800	
26	1.201	1.484	16781	4060	27.086	17.500	
27	1.005	1.148	17721	2765	25.610	17.600	
28	0.796	0.969	7239	2679	28.147	10.700	
29	0.727	0.938	22046	2008	21.774	13.700	
30	0.786	0.918	7637	3464	29.242	15.300	
31	0.796	1.023	52758	0	15.370	0.000	
AVERAGE	1.029		14175		21.064		
MINIMUM				0		0.000	
MAXIMUM		1.609					

Total Number of Samples	43,834	Number of Readings <= 2.0 NTU:	43,834
% Readings <=2.0 NTU	100.0	Average Filter Effluent NTU:	1.029
		Maximum Filter Effluent NTU:	1.609
		Meets Standard (i.e. at least 95% of readings are <= 2.0 NTU) (Y/N)?	Yes

Percentile Results:

xth Percentile NTU Value of all average Turbidity Readings	50 th	1.01
(x% of all average turbidity readings are less than these values)	90 th	1.20
	95 th	1.31
	98 th	1.36
	99 th	1.40

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OTAY WATER DISTRICT - Ralph W. Chapman Water Recycling Facility
DISCHARGE ORDER No. R9-2007-0038
WDID No. 9 000000217 SCR: 251548: MVALD
DISCHARGE REPORT FOR (Dec / 2008)

Hour 24 hour format	TURBIDITY (NTU)	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
12:00 AM	Average Hour	1.467	1.230	1.029	0.791	1.098	1.045	0.868	0.978	1.037	1.131	0.985	0.977	1.082	1.108	1.019	1.033
1:00 AM	Average Hour	1.274	1.079	0.910	0.745	1.020	0.954	0.800	0.908	0.970	1.043	0.935	0.902	1.017	0.996	0.946	0.973
2:00 AM	Average Hour	1.328	1.077	0.916	0.762	1.131	1.027	0.873	0.978	1.015	1.072	0.942	0.951	1.062	1.025	1.017	1.003
3:00 AM	Average Hour	1.425	1.169	0.954	0.770	1.253	1.057	0.905	1.016	1.042	1.062	0.947	0.967	1.061	1.033	1.027	1.014
4:00 AM	Average Hour	1.408	1.166	0.931	0.750	1.257	1.024	0.884	1.005	1.017	0.999	0.908	0.931	1.027	1.004	1.004	0.982
5:00 AM	Average Hour	1.233	1.028	0.834	0.713	1.242	0.987	0.863	0.983	0.985	0.950	0.873	0.900	1.004	0.984	0.981	0.957
6:00 AM	Average Hour	1.343	1.045	0.878	0.756	1.247	0.956	0.845	0.979	0.986	0.947	0.890	0.908	1.012	0.976	0.984	0.952
7:00 AM	Average Hour	1.420	1.111	0.899	0.758	1.132	0.869	0.782	0.894	1.045	0.934	0.988	0.959	0.973	0.910	0.966	0.940
8:00 AM	Average Hour	1.448	1.141	0.867	0.748	1.236	0.919	0.843	0.919	1.048	1.035	0.963	1.081	1.148	1.005	1.201	1.006
9:00 AM	Average Hour	1.384	1.084	0.824	0.726	1.346	0.939	0.882	1.005	1.217	1.030	1.050	1.108	1.196	1.042	1.217	1.037
10:00 AM	Average Hour	1.390	1.086	0.832	0.785	1.302	0.908	0.874	1.020	1.247	0.995	1.020	1.111	1.190	1.017	1.108	1.060
11:00 AM	Average Hour	1.466	1.162	0.851	0.822	1.269	0.887	0.858	1.015	1.212	0.969	0.993	1.045	1.188	0.994	1.120	1.013
12:00 PM	Average Hour	1.410	1.148	0.879	0.812	1.228	0.867	0.846	0.993	1.192	0.955	0.985	1.004	1.198	0.972	1.094	1.002
1:00PM	Average Hour	1.226	1.035	0.849	0.756	1.104	0.808	0.808	0.932	1.149	0.951	0.965	0.976	1.141	0.924	1.047	0.961
2:00 PM	Average Hour	1.142	0.990	0.842	0.796	1.042	0.826	0.838	0.941	1.000	1.185	0.989	1.050	1.133	0.975	1.151	1.019
3:00 PM	Average Hour	1.323	1.141	0.881	0.871	1.183	0.900	0.927	1.067	1.189	1.312	1.025	1.214	1.188	1.011	1.167	1.053
4:00 PM	Average Hour	1.332	1.148	0.852	0.891	1.190	0.895	0.927	1.078	1.165	1.182	1.064	1.429	1.181	1.015	1.163	1.045
5:00 PM	Average Hour	1.136	0.989	0.774	0.902	1.161	0.885	0.926	1.058	1.219	1.106	1.120	1.555	1.193	1.022	1.149	1.045
6:00 PM	Average Hour	1.186	1.028	0.795	0.915	1.131	0.881	0.936	1.045	1.229	1.068	1.132	1.479	1.209	1.031	1.131	1.044
7:00 PM	Average Hour	1.314	1.117	0.823	0.849	0.997	0.790	0.860	0.967	1.143	1.052	1.080	1.271	1.073	0.959	1.065	0.954
8:00 PM	Average Hour	1.306	1.103	0.816	0.928	1.069	0.851	0.930	1.037	1.225	1.003	1.105	1.216	1.139	1.050	1.118	1.027
9:00 PM	Average Hour	1.152	0.993	0.784	1.034	1.142	0.918	1.000	1.083	1.248	1.021	1.052	1.150	1.152	1.081	1.109	1.023
10:00 PM	Average Hour	1.070	0.942	0.790	1.054	1.120	0.904	0.992	1.064	1.208	1.004	1.006	1.104	1.139	1.049	1.079	1.006
11:00 PM	Average Hour	1.220	1.047	0.811	1.075	1.085	0.886	0.982	1.049	1.163	1.005	0.983	1.087	1.128	1.038	1.051	0.987

Hour 12 hour format	TURBIDITY (NTU)	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31
12:00 AM	Average Hour	0.974	0.783	0.921	1.123	1.249	1.142	1.078	1.290	1.403	1.464	1.040	0.846	0.642	0.756	0.801
1:00 AM	Average Hour	0.903	0.775	0.857	1.025	1.109	1.051	0.999	1.177	1.278	1.309	1.007	0.929	0.693	0.756	0.797
2:00 AM	Average Hour	0.959	0.827	0.928	1.018	1.078	1.044	0.998	1.146	1.228	1.229	0.980	0.943	0.739	0.749	0.794
3:00 AM	Average Hour	0.959	0.820	1.039	1.198	1.277	1.196	1.127	1.364	1.474	1.431	0.891	0.908	0.732	0.737	0.791
4:00 AM	Average Hour	0.924	0.796	1.031	1.233	1.294	1.206	1.140	1.411	1.536	1.446	0.896	0.863	0.711	0.728	0.787
5:00 AM	Average Hour	0.903	0.778	1.002	1.208	1.264	1.182	1.120	1.398	1.526	1.426	0.991	0.820	0.687	0.728	0.784
6:00 AM	Average Hour	0.907	0.757	0.973	1.173	1.230	1.148	1.090	1.370	1.507	1.393	0.992	0.772	0.661	0.709	0.769
7:00 AM	Average Hour	0.926	0.767	0.879	1.046	1.094	1.039	1.002	1.211	1.321	1.232	0.925	0.808	0.651	0.618	0.720
8:00 AM	Average Hour	1.111	0.760	0.906	1.003	1.042	0.979	0.956	1.249	1.236	1.117	0.976	0.877	0.709	0.685	0.781
9:00 AM	Average Hour	1.172	0.757	0.979	1.139	1.137	1.089	1.053	1.427	1.430	1.228	1.059	0.869	0.760	0.788	0.751
10:00 AM	Average Hour	1.120	0.753	0.971	1.181	1.159	1.106	1.081	1.446	1.496	1.258	1.097	0.834	0.738	0.837	0.838
11:00 AM	Average Hour	1.062	0.737	0.952	1.149	1.149	1.098	1.085	1.412	1.504	1.229	1.080	0.786	0.710	0.858	0.845
12:00 PM	Average Hour	0.946	0.719	0.938	1.104	1.126	1.129	1.126	1.365	1.481	1.187	0.957	0.708	0.790	0.846	0.853
1:00PM	Average Hour	0.856	0.705	0.888	1.061	1.060	1.161	1.111	1.238	1.382	1.090	0.965	0.658	0.763	0.821	0.862
2:00 PM	Average Hour	0.938	0.742	0.861	0.986	0.939	1.163	1.144	1.077	1.257	0.997	1.048	0.711	0.804	0.699	-
3:00 PM	Average Hour	0.941	0.809	1.110	1.197	1.135	1.487	1.325	1.320	1.529	1.156	1.013	0.703	0.799	0.749	-
4:00 PM	Average Hour	0.857	0.815	1.183	1.236	1.167	1.414	1.350	1.384	1.593	1.170	0.982	0.709	0.767	0.885	-
5:00 PM	Average Hour	0.842	0.814	1.163	1.226	1.163	1.308	1.304	1.380	1.572	1.140	1.128	0.833	0.736	0.900	-
6:00 PM	Average Hour	0.834	0.813	1.123	1.202	1.145	1.224	1.255	1.366	1.536	1.103	1.117	0.834	0.713	0.880	-
7:00 PM	Average Hour	0.804	0.785	0.988	1.048	1.021	1.053	1.087	1.207	1.343	0.987	1.070	0.804	0.700	0.853	-
8:00 PM	Average Hour	0.835	0.832	0.965	1.088	1.019	1.009	1.096	1.171	1.295	0.979	1.025	0.767	0.713	0.834	-
9:00 PM	Average Hour	0.847	0.945	1.117	1.266	1.158	1.122	1.269	1.357	1.485	1.094	0.991	0.733	0.736	0.818	-
10:00 PM	Average Hour	0.826	0.951	1.148	1.297	1.183	1.129	1.307	1.408	1.518	1.098	0.958	0.706	0.749	0.814	-
11:00 PM	Average Hour	0.804	0.935	1.137	1.274	1.185	1.111	1.302	1.409	1.499	1.071	0.928	0.689	0.752	0.809	-

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OTAY WATER DISTRICT - Ralph W. Chapman Water Recycling Facility
DISCHARGE ORDER No. R9-2007-0038
WDID No. 9 000000217
DISCHARGE REPORT FOR (Dec / 2008)

SCR: 251548: MVALD

* Chlorine Contact Time was <450 mg-min/L

DATE	Start Time	StopTime	CHLORINE CONTACT TIME (mg-min/L)	COMMENTS OR NOTES
12/03/08	11:45	11:45	0	From 12 mid - 11:59pm
12/09/08	16:04	16:04	0	1 minute(s) in violation.
12/10/08	19:17	19:17	0	1 minute(s) in violation.
12/17/08	16:25	16:25	0	1 minute(s) in violation.
12/31/08	14:15	23:59	0	1 minute(s) in violation.
				585 minute(s) in violation.

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OTAY WATER DISTRICT - Ralph W. Chapman Water Recycling Facility
DISCHARGE ORDER No. R9-2007-0038
WDID No. 9 000000217
DISCHARGE REPORT FOR (Dec / 2008)

SCR: 251548: MVALD

* Filter Effluent Turbidity 24 Hour Daily Average Exceeded 2 NTU.

DATE	Start Time	StopTime	TURBIDITY (NTU)	COMMENTS OR NOTES
				From 12 mid - 11:59pm
				NO VIOLATION TO REPORT THIS MONTH.

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OTAY WATER DISTRICT - Ralph W. Chapman Water Recycling Facility
DISCHARGE ORDER No. R9-2007-0038
WDID No. 9 000000217
DISCHARGE REPORT FOR (Dec / 2008)

SCR: 251548: MVALD

* Filter Effluent Turbidity Exceeded 5 NTU for more than 1.2 hours

DATE	Start Time	StopTime	TURBIDITY (NTU)	COMMENTS OR NOTES
				NO VIOLATION TO REPORT THIS MONTH. From 12 mid - 11:59pm

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OTAY WATER DISTRICT - Ralph W. Chapman Water Recycling Facility
DISCHARGE ORDER No. R9-2007-0038
WDID No. 9 000000217
DISCHARGE REPORT FOR (Dec / 2008)

SCR: 251548: MVALD

* Filter Effluent Turbidity Exceeded 10 NTU at any time

DATE	Start Time	StopTime	TURBIDITY (NTU)	COMMENTS OR NOTES
				NO VIOLATION TO REPORT THIS MONTH. From 12 mid - 11:59pm

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2008 Annual Report for RWCWRF Effluent

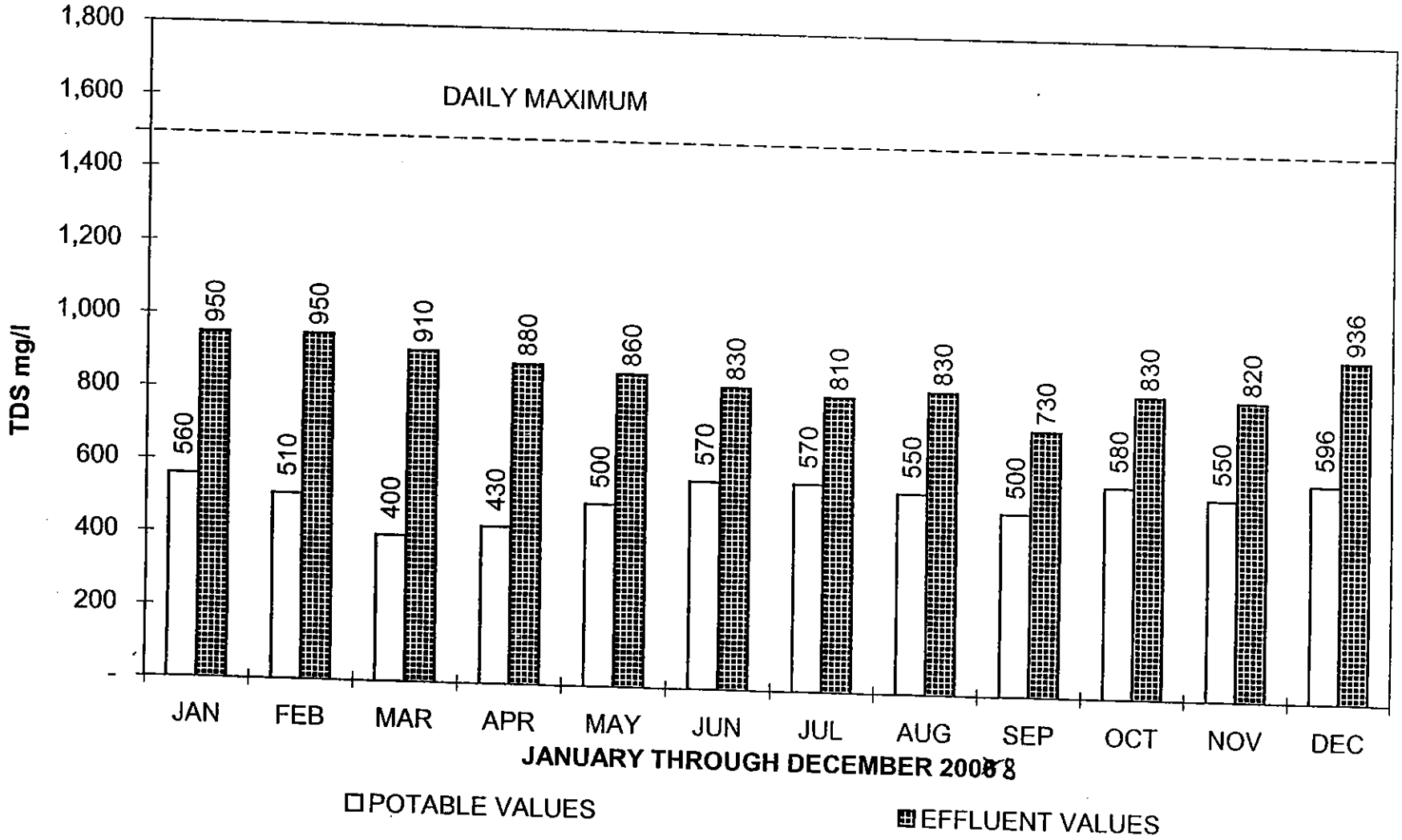
Constituent/Parameter	Method	Sample Date	Sample Type	Result (mg/L)	MCL(mg/L)
Aluminum	200.8	10/8/2008	24hr-Composite	0.047	1
Arsenic	200.8	10/8/2008	24hr-Composite	0.0011	0.05
Antimony	200.8	10/8/2008	24hr-Composite	ND<0.001	0.006
Barium	200.8	10/8/2008	24hr-Composite	0.086	1
Beryllium	200.8	10/8/2008	24hr-Composite	ND<0.001	0.004
Cadmium	200.8	10/8/2008	24hr-Composite	ND<0.0005	0.005
Chromium	200.8	10/8/2008	24hr-Composite	0.0028	0.05
Copper	200.8	10/8/2008	24hr-Composite	0.0065	1.3*
Cyanide	335.4	10/8/2008	24hr-Composite	ND<0.005	0.2
Lead	200.8	10/8/2008	24hr-Composite	0.00069	0.015*
Mercury	245.1	10/8/2008	24hr-Composite	ND<0.0002	0.002
Nickel	200.8	10/8/2008	24hr-Composite	ND<0.005	0.1
Nitrate as NO_3	300.0	10/8/2008	24hr-Composite	70	45
Nitrite as N	300.0	10/8/2008	24hr-Composite	ND<1.0	1
Selenium	200.8	10/8/2008	24hr-Composite	ND<0.005	0.05
Silver	200.8	10/8/2008	24hr-Composite	ND<0.0005	0.1*
Thallium	200.8	10/8/2008	24hr-Composite	ND<0.001	0.002
Asbestos	100.2	10/8/2008	24hr-Composite	ND<0.2 (MFL)	7(MFL)
Benzene	524.2	10/8/2008	Grab	ND<0.0005	0.001
Carbon Tetrachloride	524.2	10/8/2008	Grab	0.0021	0.005*
1,2-Dichlorobenzene	524.2	10/8/2008	Grab	ND<0.0005	0.6
1,4-Dichlorobenzene	524.2	10/8/2008	Grab	ND<0.0005	0.005
1,1-Dichloroethane	524.2	10/8/2008	Grab	ND<0.0005	0.005
1,2-Dichloroethane	524.2	10/8/2008	Grab	ND<0.0005	0.0005
1,1-Dichloroethylene	524.2	10/8/2008	Grab	ND<0.0005	0.006
cis-1,2-Dichloroethylene	524.2	10/8/2008	Grab	ND<0.0005	0.006
trans-1,2-Dichloroethylene	524.2	10/8/2008	Grab	ND<0.0005	0.01
Dichloromethane	524.2	10/8/2008	Grab	ND<0.0005	0.005
1,2-Dichloropropane	524.2	10/8/2008	Grab	ND<0.0005	0.005
1,3-Dichloropropene	524.2	10/8/2008	Grab	ND<0.0005	0.0005
Ethylbenzene	524.2	10/8/2008	Grab	ND<0.0005	0.7
Monochlorobenzene	524.2	10/8/2008	Grab	ND<0.0005	0.07
Styrene	524.2	10/8/2008	Grab	ND<0.0005	0.1
1,1,2,2-Tetrachloroethane	524.2	10/8/2008	Grab	ND<0.0005	0.001
Tetrachloroethylene	524.2	10/8/2008	Grab	ND<0.0005	0.005
Toluene	524.2	10/8/2008	Grab	ND<0,0005	0.15
1,2,4-Trichlorobenzene	524.2	10/8/2008	Grab	ND<0.0005	0.07
1,1,1-Trichloroethane	524.2	10/8/2008	Grab	ND<0.0005	0.200
1,1,2-Trichloroethane	524.2	10/8/2008	Grab	ND<0.0005	0.005
Trichloroethylene	524.2	10/8/2008	Grab	ND<0.0005	0.005
Trichlorofluoromethane	524.2	10/8/2008	Grab	ND<0.0005	0.15
1,1,2-Trichloro-1,2,2-trifluoroethane	524.2	10/8/2008	Grab	ND<0.0005	No reference
Vinyl Chloride	524.2	10/8/2008	Grab	ND<0.0003	0.0005
Xylenes	524.2	10/8/2008	Grab	ND<0.001	1.75
Alachlor	505	10/8/2008	Grab	ND<0.0001	0.002
Atrazine	525.2	10/8/2008	Grab	ND<0.00005	0.003
Bentazon	515.4	10/8/2008	Grab	ND<0.0005	0.004
Benzo(a)pyrene	525.2	10/8/2008	Grab	ND<0.00002	0.0002
Carbofuran	531.2	10/8/2008	Grab	ND<0.0005	0.018

Annual Report for RWCWRF Effluent

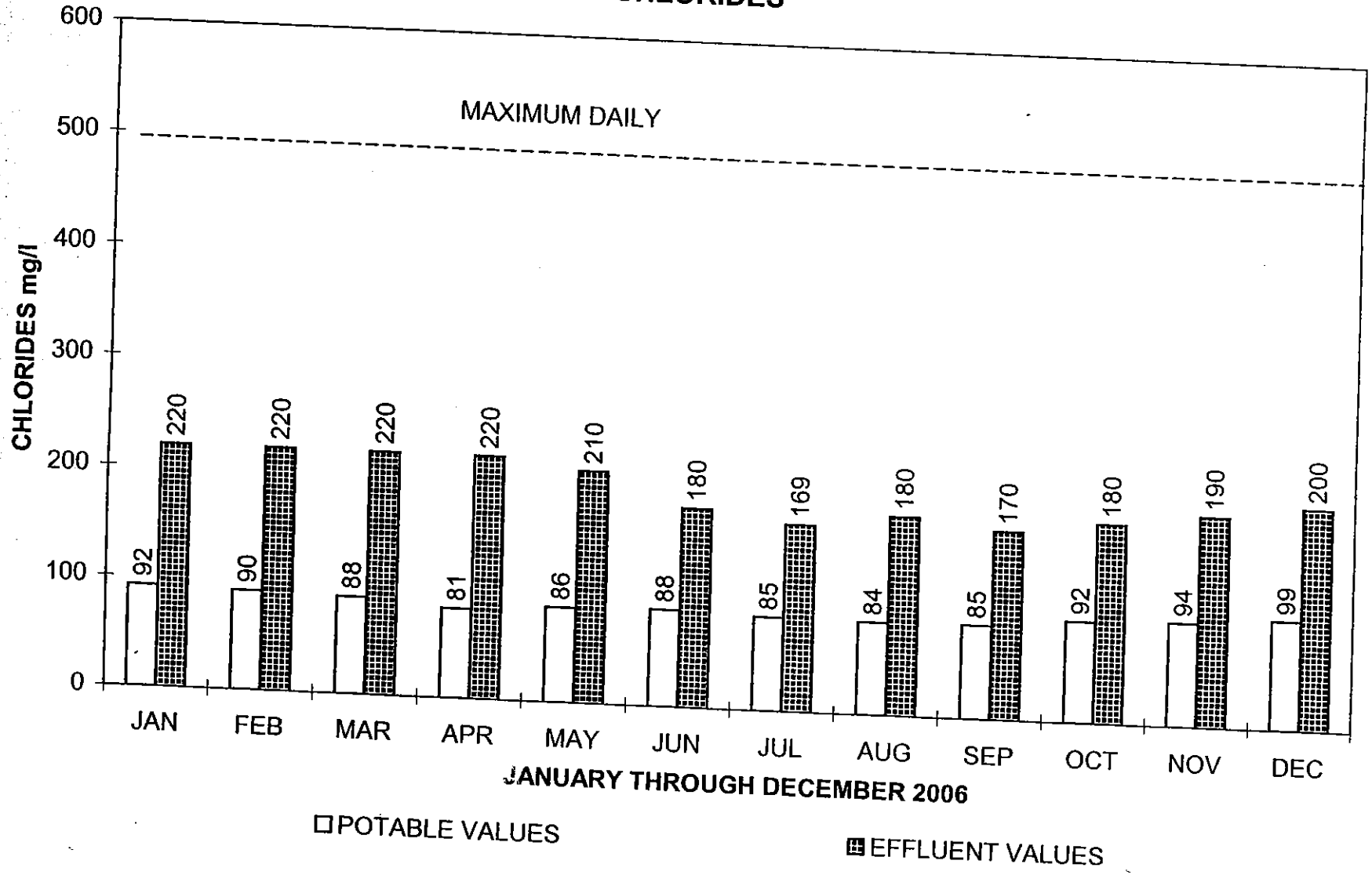
Constituent/Parameter	Method	Sample Date	Sample Type	Result	MCL
Chlordane	505	10/8/2008	Grab	ND<0.0001	0.0001
2,4,-D	515.4	10/8/2008	Grab	ND<0.0001	0.07
Dalapon	515.4	10/8/2008	Grab	0.003	0.2
1,2-Dibromo-3-chloropropane	504.1	10/8/2008	Grab	ND<0.00001	0.0002
Di (2-ethylhexyl)adipate	525.2	10/8/2008	Grab	ND<0.0006	0.4
Di (2-ethylhexyl)phthalate	525.2	10/8/2008	Grab	ND<0.0006	0.004
Dinoseb	515.4	10/8/2008	Grab	ND<0.0002	0.007
Diquat	549.2	10/8/2008	Grab	ND<0.0004	0.02
Endothall	548.1	10/8/2008	Grab	ND<0.02	0.1
Endrin	505	10/8/2008	Grab	ND<0.00001	0.002
Ethylene Dibromide	504.1	10/8/2008	Grab	ND<0.00001	0.00005
Glyphosate	547	10/8/2008	Grab	ND<0.006	0.7
Heptachlor	505	10/8/2008	Grab	ND<0.00001	0.0004*
Heptachlor Epoxide	505	10/8/2008	Grab	ND<0.00001	0.00001
Hexachlorobenzene	525.2	10/8/2008	Grab	ND<0.00005	0.001
Hexachlorocyclopentadiene	525.2	10/8/2008	Grab	ND<0.00005	0.05
Lindane	505	10/8/2008	Grab	ND<0.00001	0.0002
Methoxychlor	505	10/8/2008	Grab	ND<0.00005	0.04
Molinate	525.2	10/8/2008	Grab	ND<0.0001	0.02
Oxamyl	531.2	10/8/2008	Grab	ND<0.0005	0.2
Pentachlorophenol	515.4	10/8/2008	Grab	ND<0.00004	0.001
Picloram	515.4	10/8/2008	Grab	ND<0.0001	0.5
Polychlorinated Biphenyls	505	10/8/2008	Grab	ND<0.00008	0.0005
Simazine	525.2	10/8/2008	Grab	ND<0.00005	0.004
Thiobencarb	525.2	10/8/2008	Grab	ND<0.0002	0.07
Toxaphene	505	10/8/2008	Grab	ND<0.0005	0.003
2,3,7,8-TCDD (Dioxin)	1613B	10/8/2008	Grab	ND< 5E-09	3E-08
2,4,5-TP Silvex	515.4	10/8/2008	Grab	ND<0.0002	0.05

Notes:
mg/L : milligrams/Liter
MFL: Million Fibers per Liter
*MCLs values based on the National Primary and Secondary Drinking Water Regulations.

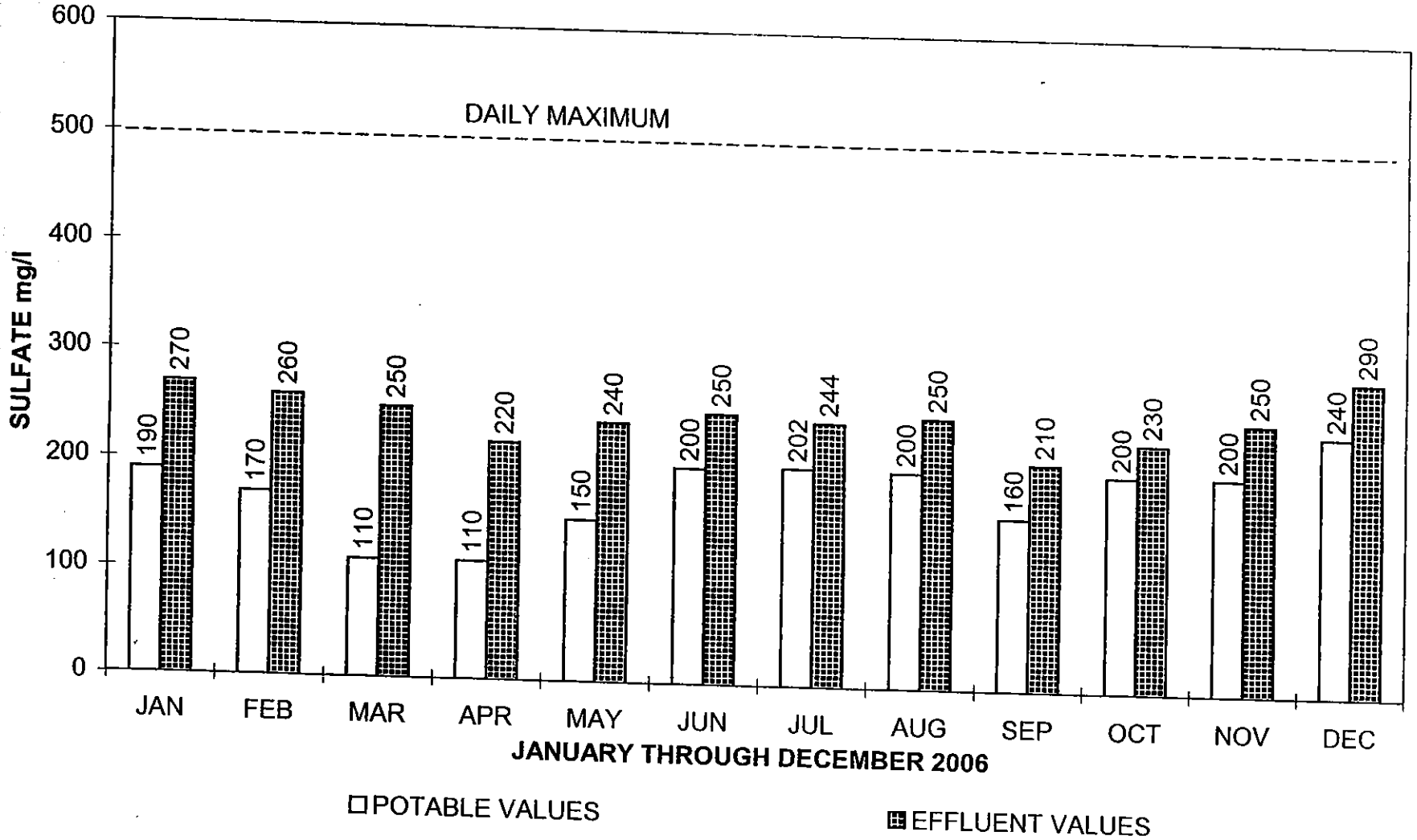
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
TDS



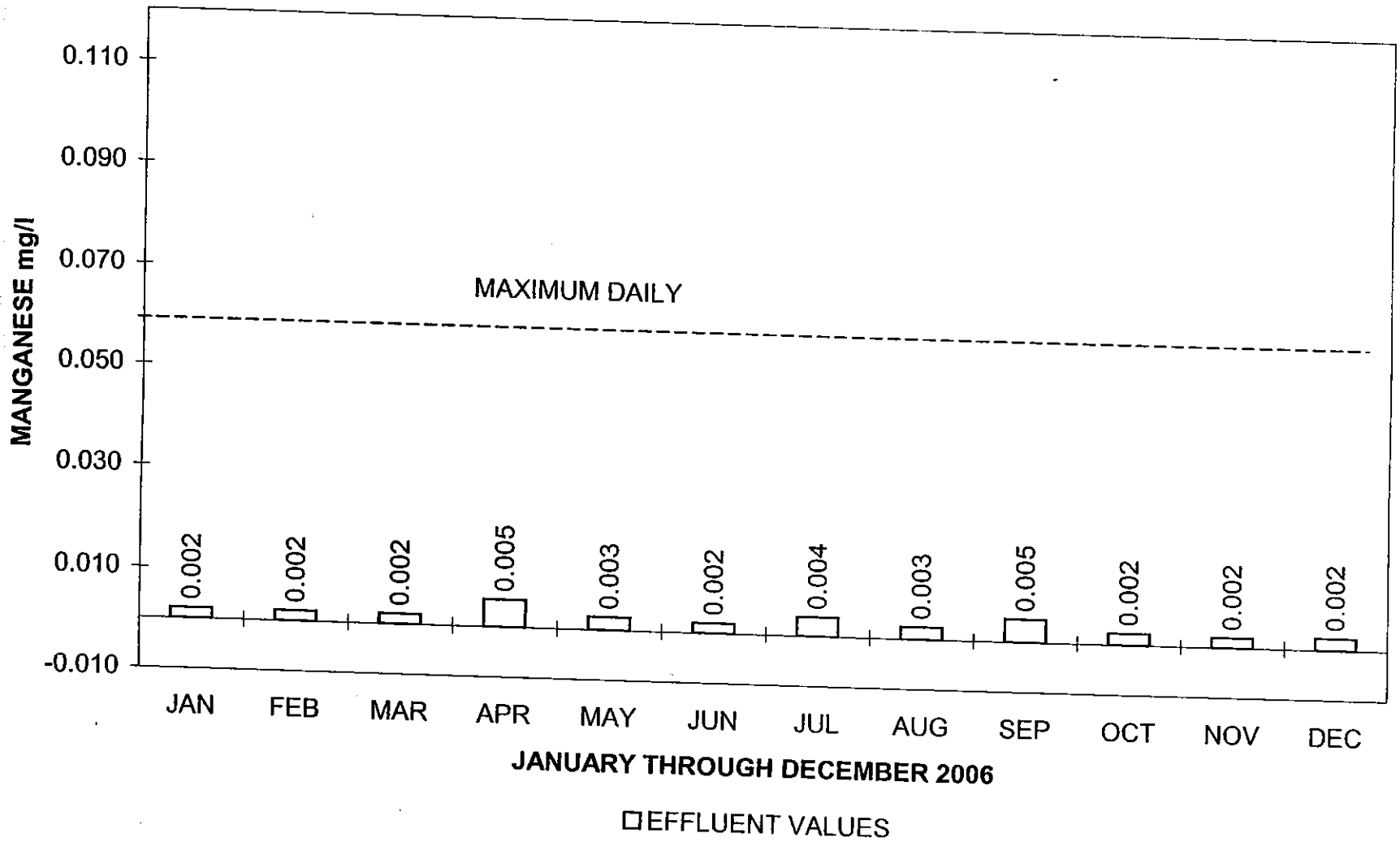
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
CHLORIDES



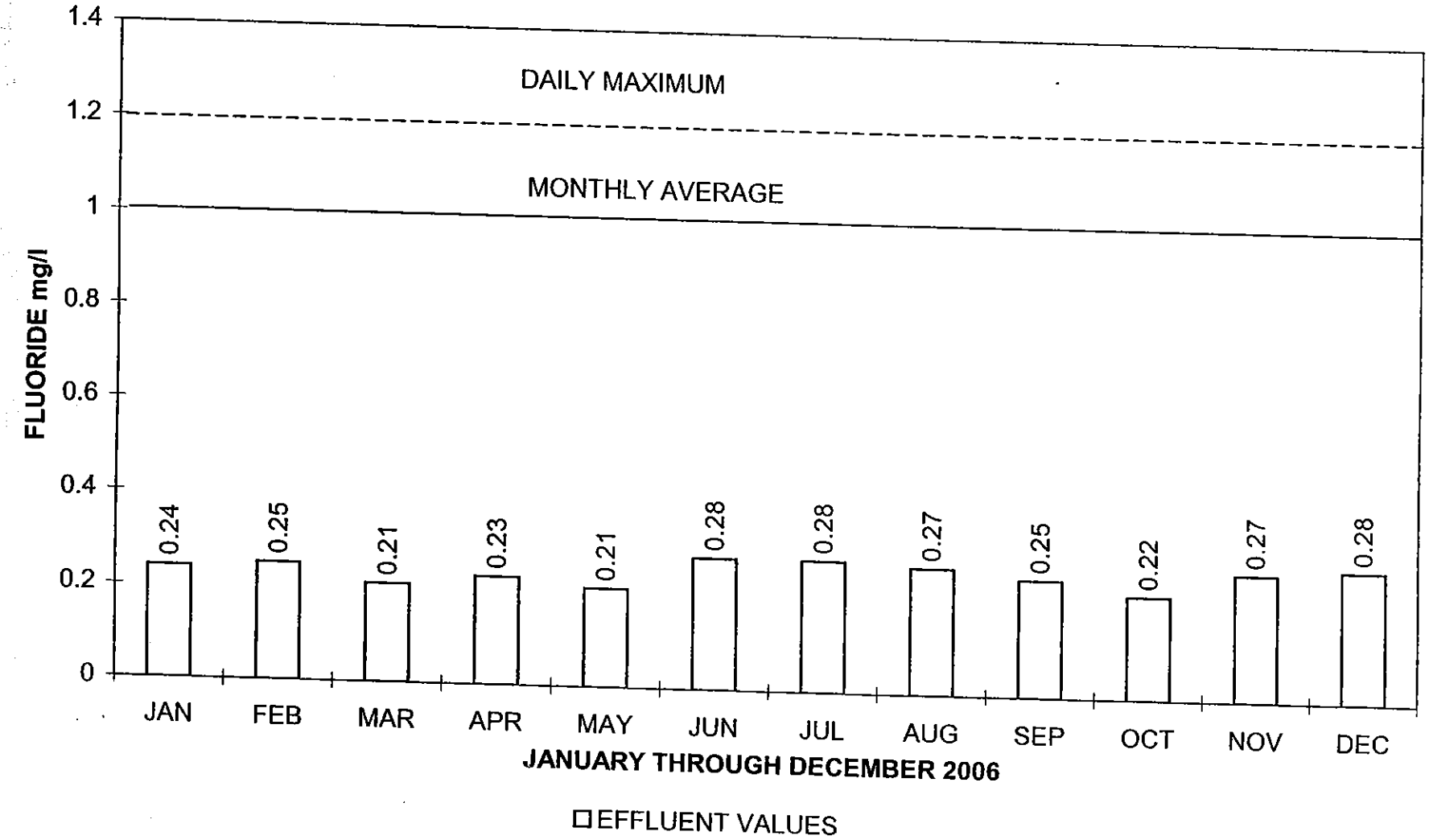
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
SULFATE



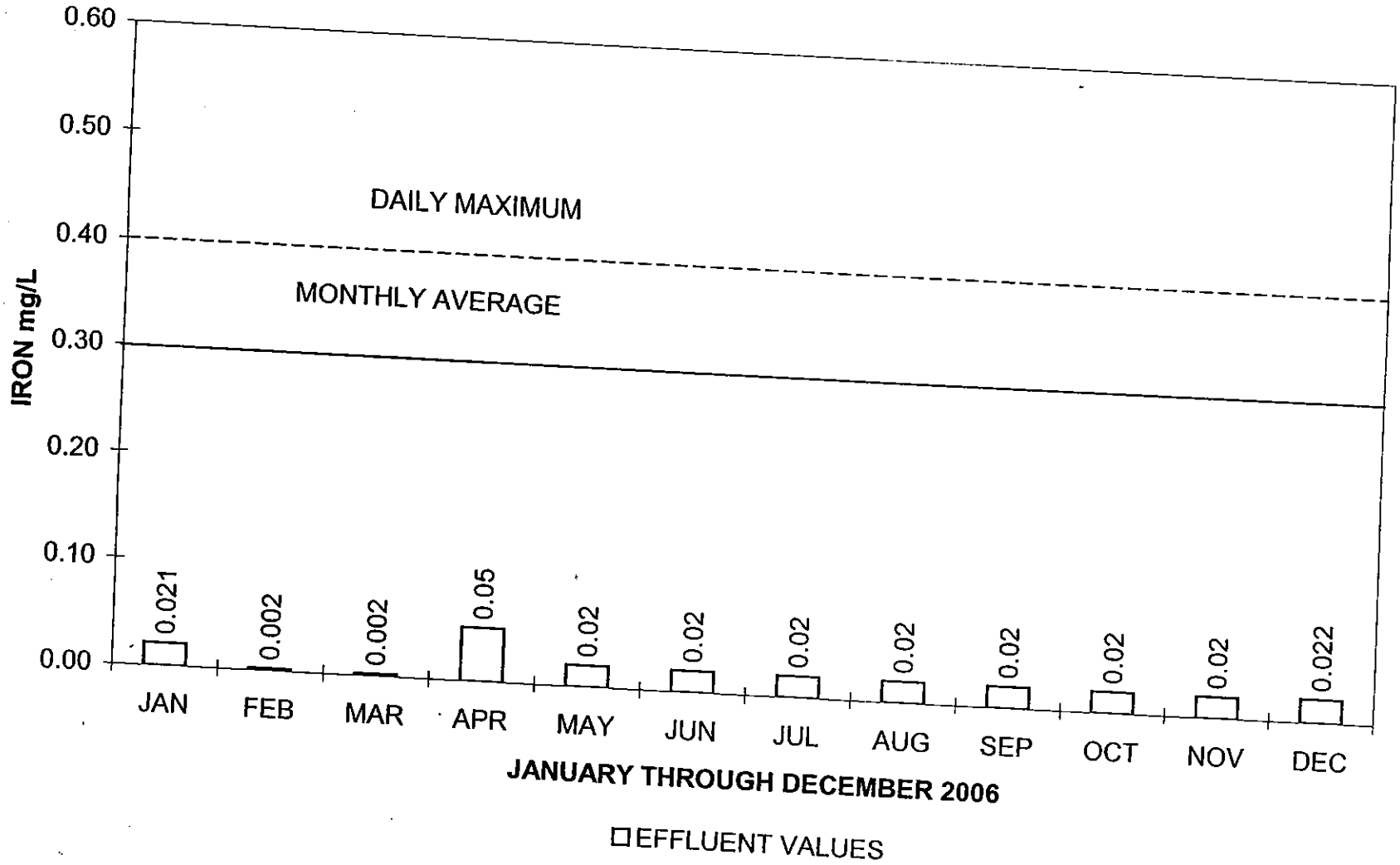
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
MANGANESE



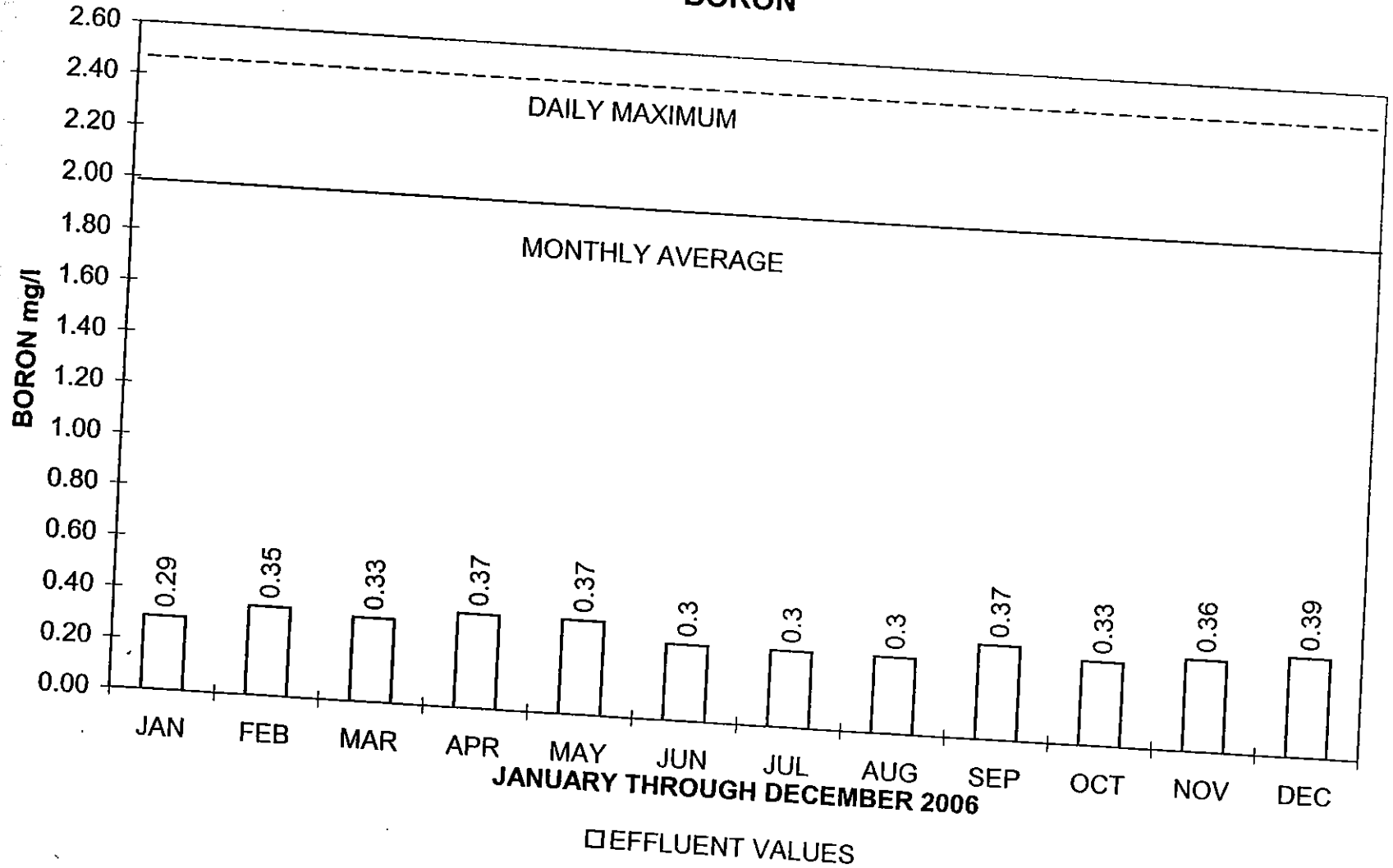
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
FLUORIDES



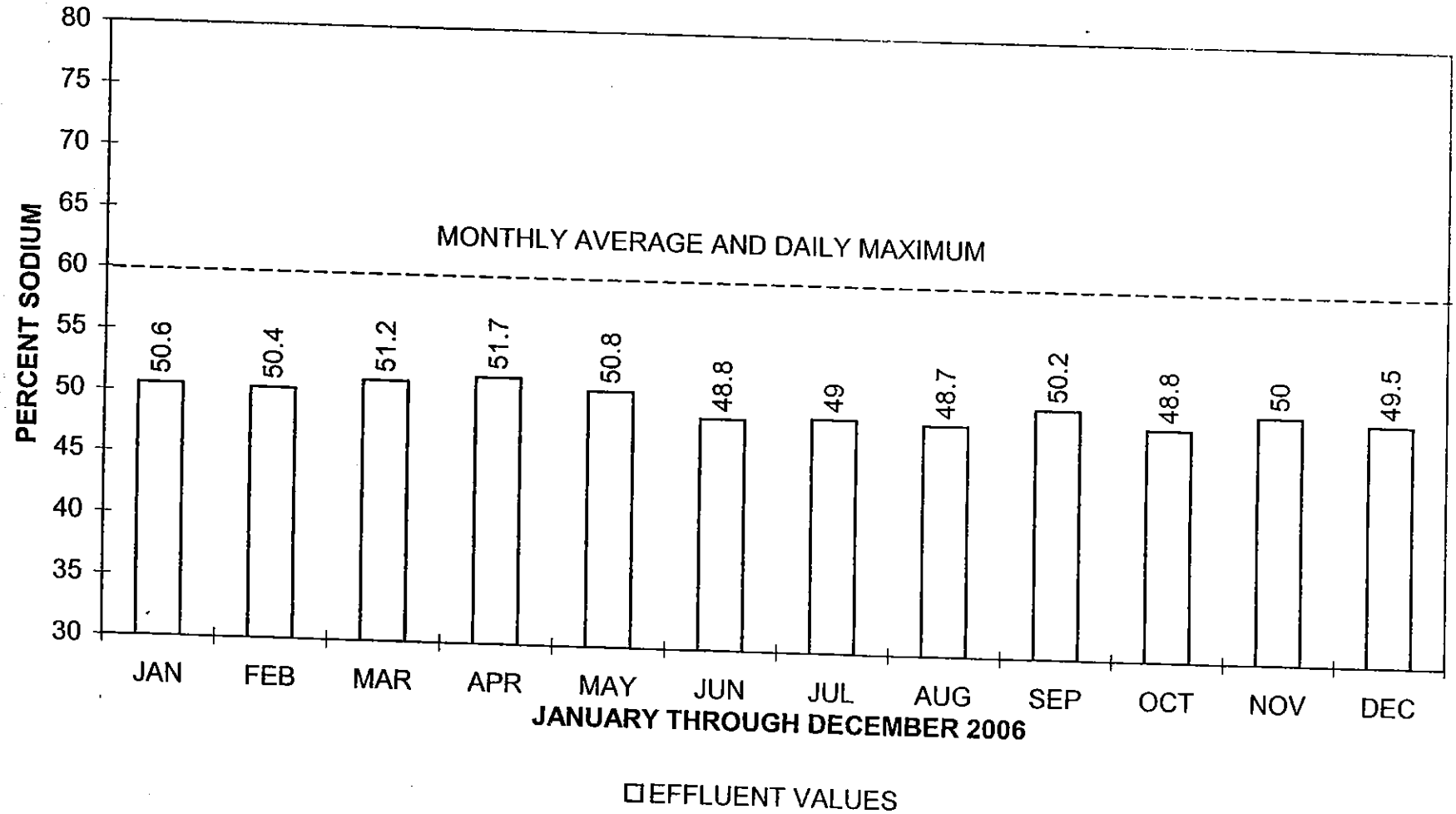
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
IRON



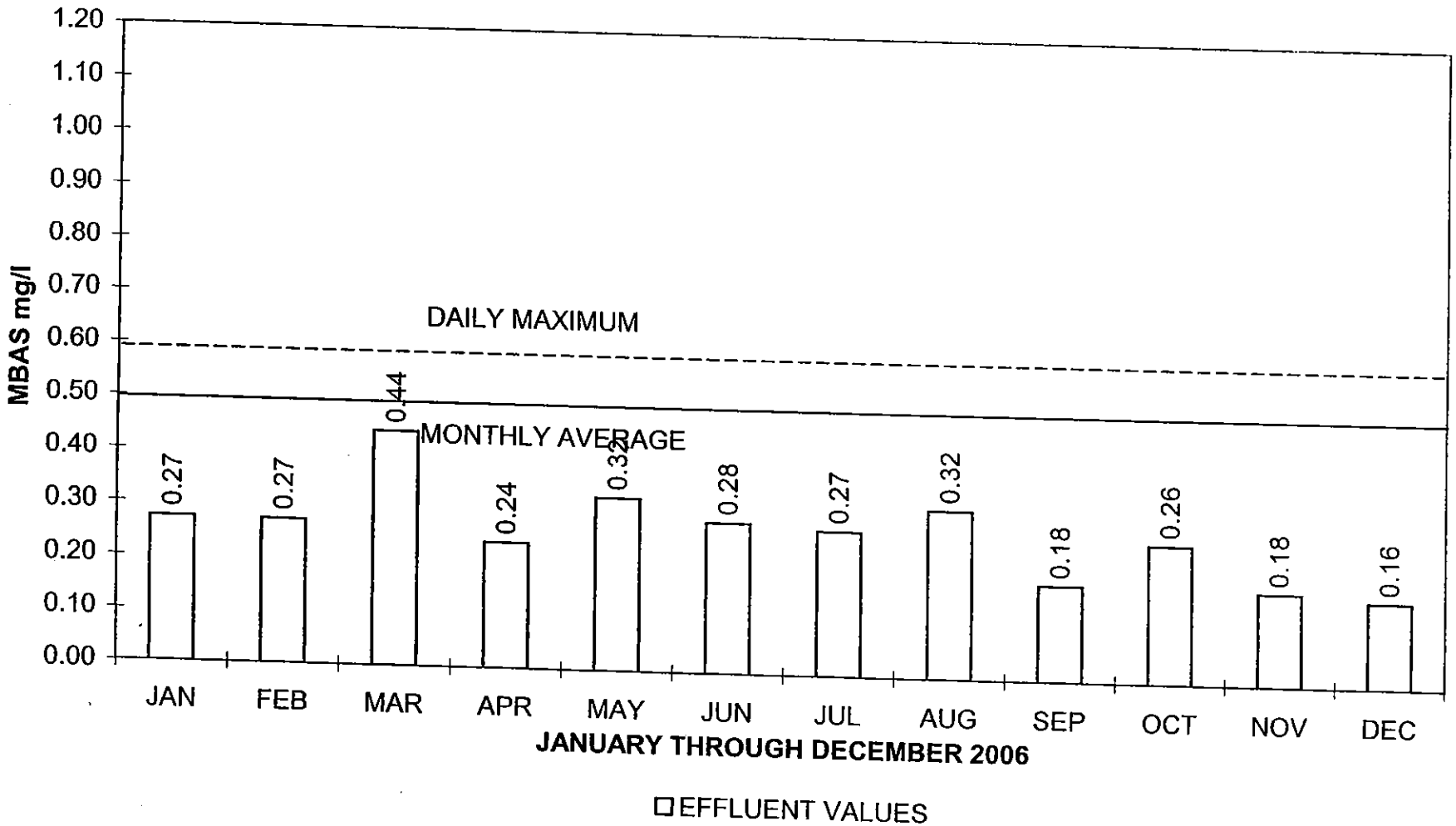
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
BORON



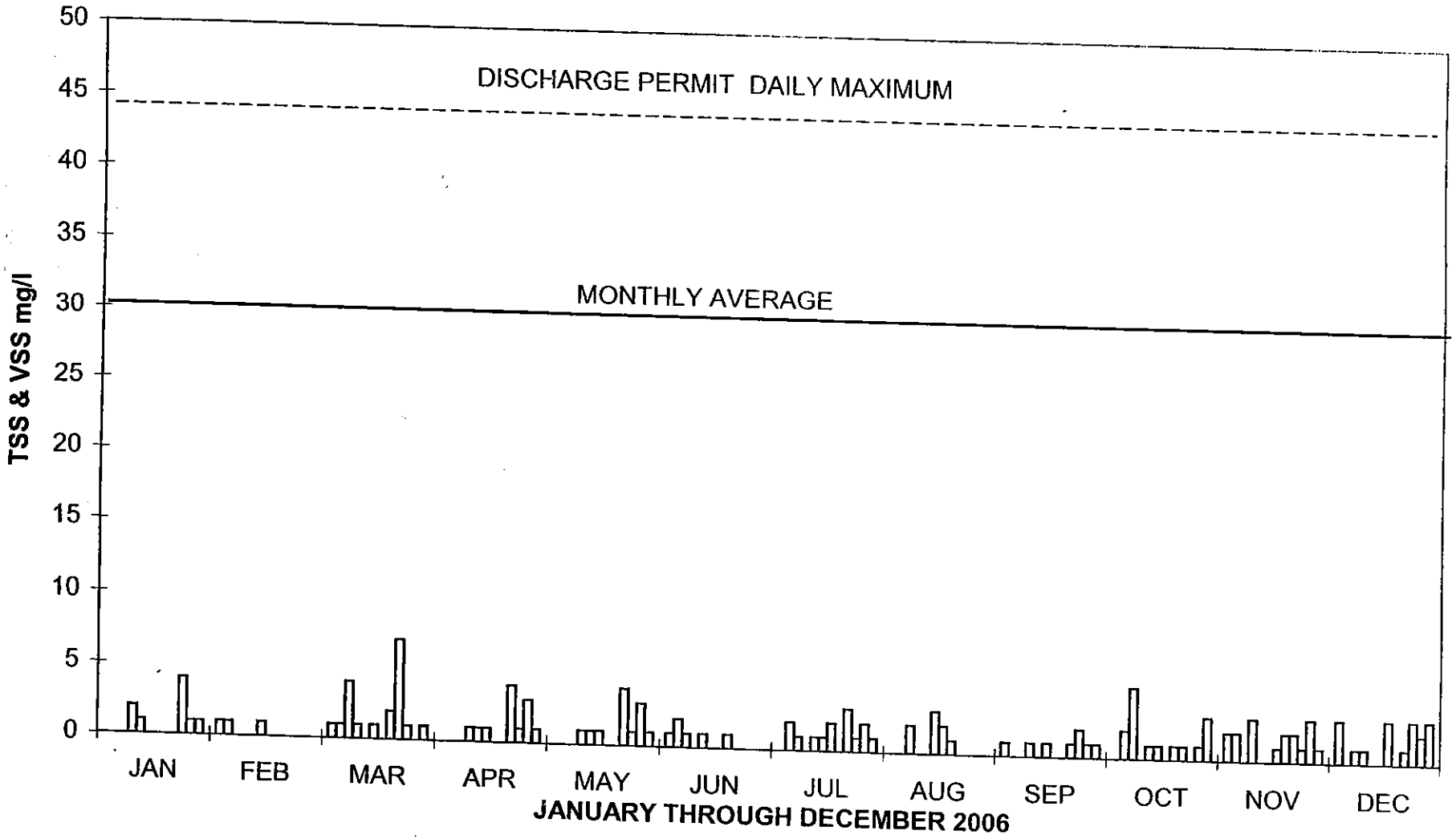
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
SODIUM



OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
MBAS

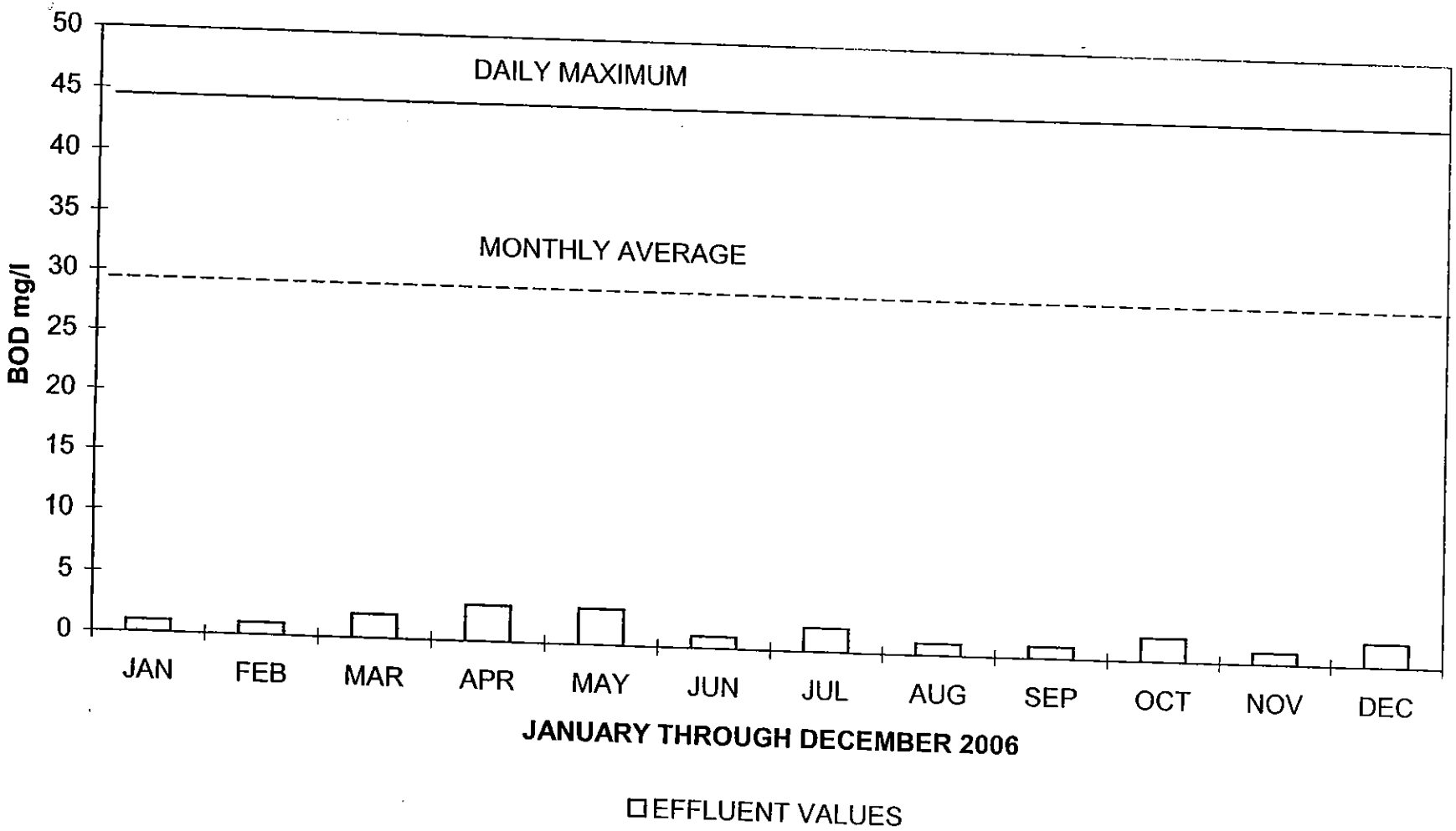


OTAYWATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
TSS & VSS

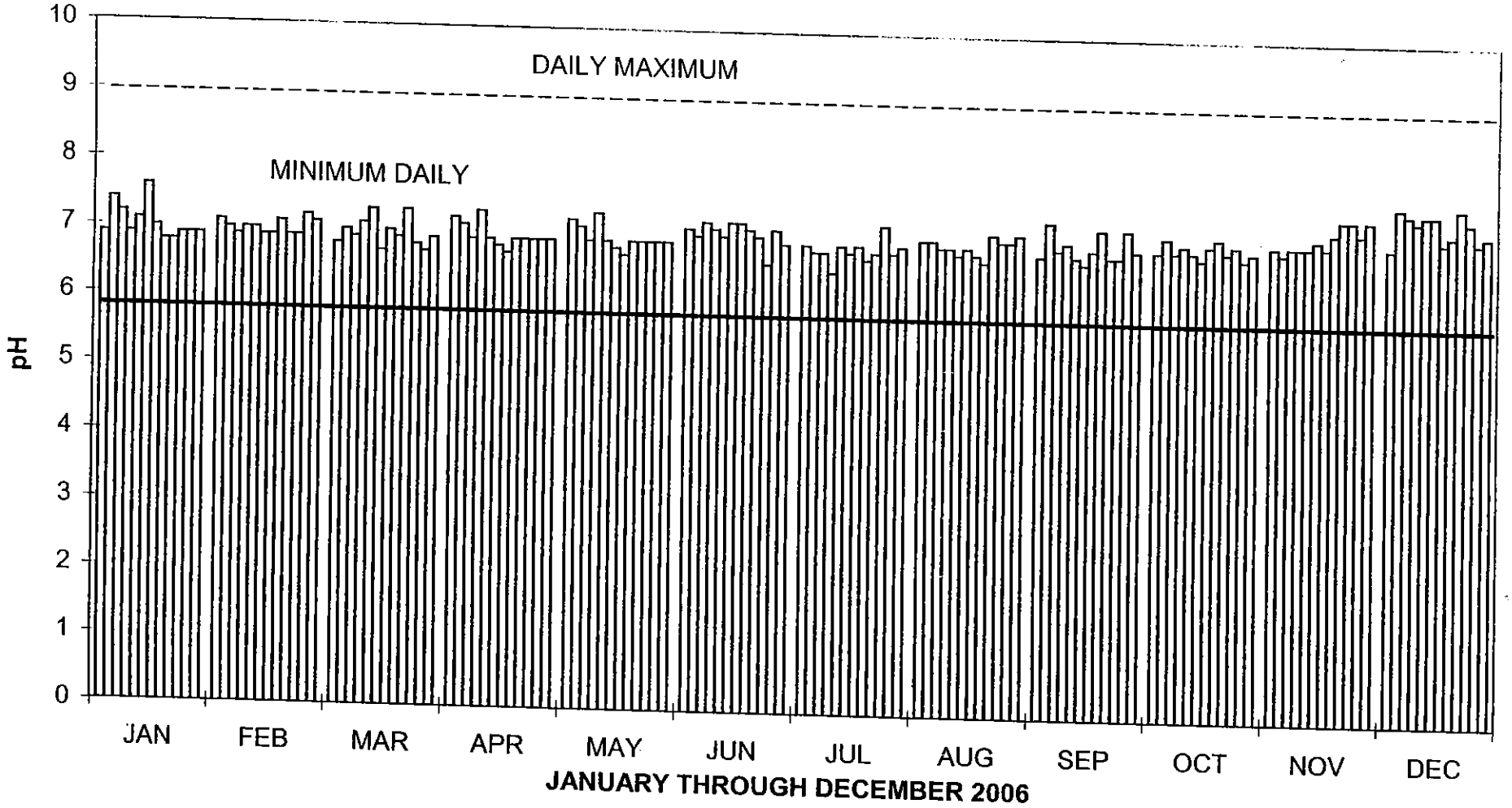


EFFLUENT VALUES

OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
BOD



OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
pH



EFFLUENT VALUES

RALPH W. CHAPMAN WATER RECYCLING FACILITY
MONTHLY EFFLUENT DATA SUMMARY 2007 2008

ORDER NO.: R9-2007-0038

DATE	TDS	CL	Mn	SO4	F	Fe	B	3 PER WEEK pH					%Na	MBAS	3 PER WEEK BOD				3 PER WEEK TSS/VSS					P-TDS	P-Cl	P-SO4
1/10/2008	960	227	2.700	245	0.7	0.024	0.410	6.8	6.8	6.8	6.8	6.8	50	0.12	2	2	2	2	2	2	1	1	1.5	509	89	170
2/7/2008	932	220	0.002	244	0.6	0.020	0.420	6.7	6.8	7.0	7.0	6.9	50	0.24	2	2	2	2	1	1	1	1	1	527	96	182
3/6/2008	974	236	0.004	254	0.6	0.028	0.440	7.2	6.8	6.9	7.0	7.0	51	0.18	2	2	2	2	1	1	1	1	1	552	96	187
4/9/2008	940	227	0.004	248	0.7	0.180	0.430	6.9	6.8	6.9	6.9	6.9	51	0.22	2	2	2	2	1	2	1	1		548	95	183
5/1/2008	942	227	0.003	246	0.7	0.021	0.450	6.9	6.9	7.1	6.9	[illegible]	49	0.23	2	2	2	3	1	1	1	1		543	94	179
6/4/2008	951	231	0.014	250	0.7	0.022	0.440	6.9	7.1	7.0	5.4	6.1	48	0.30	2	2	2	2	1	1	0	2	1	582	99	208
7/9/2008	916	213	0.003	240	0.6	0.020	0.420	6.9	6.8	6.7	6.9	6.1	50	0.35	2	2	2	2	1	1	1	1	1	578	98	198
8/13/2008	918	222	0.004	249	0.7	0.020	0.460	7.0	6.8	6.9	6.9	[illegible]	52	0.21	2	2	2	2	1	1	2	1		561	97	196
9/3/2008	989	227	0.003	252	0.7	0.025	0.470	6.7	7.0	7.0	6.9	[illegible]	50	0.23	2	2	2	2	1	1	1	2		596	94	207
10/1/2008	945	210	0.002	246	0.6	0.020	0.430						50	0.08	2	2	2	2	7	7	7	7		603	94	211
11/5/2008	923	209	0.002	252	0.6	0.020	0.410	7.3	7.1	6.9	6.7	7.0	51	0.30	2	2	2	2	1	1	1	1		580	95	205
12/3/2008	927	217	0.002	245	0.6	0.020	0.410	6.7	7.1	6.9	6.8	6.1	50	0.24	3	2	2	2	1	1	1	1		563	94	190

REPORT AS OF: 1/26/2009

...Dedicated to Community Service

2554 SWEETWATER SPRINGS BOULEVARD, SPRING VALLEY, CALIFORNIA 91978-2004
TELEPHONE: 670-2222, AREA CODE 619 www.otaywater.gov

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD
2010 FEB 16 A 10: 22

February 11, 2010

Mr. John Robertus
Executive Officer
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, Ca. 92123-4340

Dear Mr. Robertus:

Enclosed is the 2009 Annual Report for the Otay Water District's Ralph W. Chapman Water Recycling Facility. Graphical and tabular summaries for all of the previous year's monitored constituents are included for your review.

The twelve month running average limitation of 9.4 mg/L for Total Nitrogen was exceeded. The January through December 2009 average sample value stands at 16.12 mg/L total nitrogen. Similarly, the Nitrate as NO_3 sample value of 74 mg/L exceeded the MCL of 45 mg/L.

In October 2009 the District selected a contractor to provide pre-design and design and bid documents as well as provide design support during the construction phase of a treatment process upgrade to meet this requirement. In December 2008 the District and a consulting firm began putting together a sampling program which will be used for the design of the treatment process upgrade. On January 19, 2010 the District began a one month sampling program which will be used in the design of a nitrogen reduction process for the Reclamation Plant.

The Ralph W. Chapman Water Recycling Facility supplies full Title 22 disinfected tertiary recycled water for spray irrigation of parkways, streetscape, neighborhood parks and common slopes within the Rancho Del Rey, Otay Ranch, Sunbow, Eastlake, Rolling Hills Ranch and Duncan Ranch communities.

If you have any questions regarding these summaries or the operation of our reclamation facility, please call me at (619) 670-2271 at your earliest convenience.

Cordially,

Dale Kreinbring
Reclamation Plant Supervisor

REPORT FOR: Thursday, Octobe **DUE DATE:** 2/15/10

EXACT SAMPLE POINT:: R.W.C.W.R.F. FACILITY/EFFLUENT

SAMPLE ANALYZED BY: ALMA ORTEGA-CARRILLO / J. SWIGGERS AND MONTGOMERY WATSON LABORATORY

ORDER NO.: 92-25

REPORT FREQUENCY: ANNUALLY

SAMPLE COLLECTED BY: Julie Wilson

SIGNED UNDER PENALTY OF PERJURY:

PARAMETER	DATE and TIME SAMPLE	FREQUENCY OF SAMPLE	UNITS	SAMPLE TYPE	SAMPLE VALUE
ALUMINUM	10/1/2009 7:00:00 AM	ANNUALLY	MG/L	24 HOUR COMPOSITE	<0.02
ARSENIC	"	"	"	"	0.0018
BARIUM	"	"	"	"	0.086
CADMIUM	"	"	"	"	<.0005
CHROMIUM	"	"	"	"	0.0019
LEAD	"	"	"	"	.00086
MERCURY	"	"	"	"	<.0002
SELENIUM	"	"	"	"	<0.005
SILVER	"	"	"	"	0.0019

2009 Annual Report for RWCWRF Effluent

Constituent/Parameter	Method	Sample Date	Sample Type	Result (mg/L)	MCL(mg/L)[a]
Aluminum	200.8	10/1/2009	24hr-Composite	ND<0.02	1
Arsenic	200.8	10/1/2009	24hr-Composite	0.0018	0.05
Antimony	200.8	10/1/2009	24hr-Composite	ND<0.001	0.006
Barium	200.8	10/1/2009	24hr-Composite	0.086	1
Beryllium	200.8	10/1/2009	24hr-Composite	ND<0.001	0.004
Cadmium	200.8	10/1/2009	24hr-Composite	ND<0.0005	0.005
Chromium	200.8	10/1/2009	24hr-Composite	0.0019	0.05
Copper	200.8	10/1/2009	24hr-Composite	0.0065	1.3*
Cyanide	335.4	10/1/2009	24hr-Composite	ND<0.005	0.2
Lead	200.8	10/1/2009	24hr-Composite	0.00086	0.015*
Mercury	245.1	10/1/2009	24hr-Composite	ND<0.0002	0.002
Nickel	200.8	10/1/2009	24hr-Composite	ND<0.005	0.1
Nitrate as NO_3	300.0	10/1/2009	24hr-Composite	74	45
Nitrite as N	300.0	10/1/2009	24hr-Composite	ND<0.25	1
Selenium	200.8	10/1/2009	24hr-Composite	ND<0.005	0.05
Silver	200.8	10/1/2009	24hr-Composite	0.0019	0.1*
Thallium	200.8	10/1/2009	24hr-Composite	ND<0.001	0.002
Asbestos	100.2	10/1/2009	24hr-Composite	ND<0.2 (MFL)	7(MFL)
Benzene	524.2	10/1/2009	Grab	ND<0.0005	0.001
Carbon Tetrachloride	524.2	10/1/2009	Grab	ND<0.0005	0.0005
1,2-Dichlorobenzene	524.2	10/1/2009	Grab	ND<0.0005	0.6
1,4-Dichlorobenzene	524.2	10/1/2009	Grab	ND<0.0005	0.005
1,1-Dichloroethane	524.2	10/1/2009	Grab	ND<0.0005	0.005
1,2-Dichloroethane	524.2	10/1/2009	Grab	ND<0.0005	0.0005
1,1-Dichloroethylene	524.2	10/1/2009	Grab	ND<0.0005	0.006
cis-1,2-Dichloroethylene	524.2	10/1/2009	Grab	ND<0.0005	0.006
trans-1,2-Dichloroethylene	524.2	10/1/2009	Grab	ND<0.0005	0.01
Dichloromethane	524.2	10/1/2009	Grab	ND<0.0005	0.005
1,2-Dichloropropane	524.2	10/1/2009	Grab	ND<0.0005	0.005
1,3-Dichloropropene	524.2	10/1/2009	Grab	ND<0.0005	0.0005
Ethylbenzene	524.2	10/1/2009	Grab	ND<0.0005	0.7
Monochlorobenzene	524.2	10/1/2009	Grab	ND<0.0005	0.07
Styrene	524.2	10/1/2009	Grab	ND<0.0005	0.1
1,1,2,2-Tetrachloroethane	524.2	10/1/2009	Grab	ND<0.0005	0.001
Tetrachloroethylene	524.2	10/1/2009	Grab	ND<0.0005	0.005
Toluene	524.2	10/1/2009	Grab	ND<0.0005	0.15
1,2,4-Trichlorobenzene	524.2	10/1/2009	Grab	ND<0.0005	0.07
1,1,1-Trichloroethane	524.2	10/1/2009	Grab	ND<0.0005	0.200
1,1,2-Trichloroethane	524.2	10/1/2009	Grab	ND<0.0005	0.005
Trichloroethylene	524.2	10/1/2009	Grab	ND<0.0005	0.005
Trichlorofluoromethane	524.2	10/1/2009	Grab	ND<0.0005	0.15
1,1,2-Trichloro-1,2,2-trifluoroethane	524.2	10/1/2009	Grab	ND<0.0005	No reference
Vinyl Chloride	524.2	10/1/2009	Grab	ND<0.0003	0.0005
Xylenes	524.2	10/1/2009	Grab	ND<0.001	1.75
Alachlor	505	10/1/2009	Grab	ND<0.0001	0.002
Atrazine	525.2	10/1/2009	Grab	ND<0.00005	0.003
Bentazon	515.4	10/1/2009	Grab	ND<0.0005	0.004
Benzo(a)pyrene	525.2	10/1/2009	Grab	ND<0.00002	0.0002
Carbofuran	531.2	10/1/2009	Grab	ND<0.0005	0.018

2009 Annual Report for RWCWRF Effluent

Constituent/Parameter	Method	Sample Date	Sample Type	Result	MCL
Chlordane	505	10/1/2009	Grab	ND<0.0001	0.0001
2,4,-D	515.4	10/1/2009	Grab	ND<0.002	0.07
Dalapon	515.4	10/1/2009	Grab	0.0032	0.2
1,2-Dibromo-3-chloropropane	504.1	10/1/2009	Grab	ND<0.00001	0.0002
Di (2-ethylhexyl)adipate	525.2	10/1/2009	Grab	ND<0.0006	0.4
Di (2-ethylhexyl)phthalate	525.2	10/1/2009	Grab	ND<0.0006	0.004
Dinoseb	515.4	10/1/2009	Grab	ND<0.0002	0.007
Diquat	549.2	10/1/2009	Grab	ND<0.0004	0.02
Endothall	548.1	10/1/2009	Grab	ND<0.02	0.1
Endrin	505	10/1/2009	Grab	ND<0.00001	0.002
Ethylene Dibromide	504.1	10/1/2009	Grab	ND<0.00001	0.00005
Glyphosate	547	10/1/2009	Grab	ND<0.006	0.7
Heptachlor	505	10/1/2009	Grab	ND<0.00001	0.0004**
Heptachlor Epoxide	505	10/1/2009	Grab	ND<0.00001	0.00001
Hexachlorobenzene	525.2	10/1/2009	Grab	ND<0.00005	0.001
Hexachlorocyclopentadiene	525.2	10/1/2009	Grab	ND<0.00005	0.05
Lindane	505	10/1/2009	Grab	ND<0.00001	0.0002
Methoxychlor	505	10/1/2009	Grab	ND<0.00005	0.04
Molinate	525.2	10/1/2009	Grab	ND<0.0001	0.02
Oxamyl	531.2	10/1/2009	Grab	ND<0.0005	0.2
Pentachlorophenol	515.4	10/1/2009	Grab	ND<0.00004	0.001
Picloram	515.4	10/1/2009	Grab	ND<0.0001	0.5
Polychlorinated Biphenyls	505	10/1/2009	Grab	ND<0.00008	0.0005
Simazine	525.2	10/1/2009	Grab	ND<0.00005	0.004
Thiobencarb	525.2	10/1/2009	Grab	ND<0.0002	0.07
Toxaphene	505	10/1/2009	Grab	ND<0.0005	0.003
2,3,7,8-TCDD (Dioxin)	1613B	10/1/2009	Grab	ND< 5E-09	3E-08
2,4,5-TP Silvex	515.4	10/1/2009	Grab	ND<0.0002	0.05

Notes:
mg/L : milligrams/Liter
MFL: Million Fibers per Liter
[a] MCL values from Table 8 Master Reclamation Permit Order No. R9-2007-0038
*MCL value is not listed on the MRPO R9-2007-0038/ The reported MCL is based on the NDWS
**MRL value is higher than MCL value listed on the MRPO R9-2007-0038 / MCL reported is based on the NDWS

REPORT FOR: Wednesday, December 02, DUE DATE: 2/1/10
EXACT SAMPLE POINT:: R.W.C.W.R.F. FACILITY/EFFLUENT
SAMPLE ANALYZED BY: ALMA ORTEGA-CARRILLO/ J. SWIGGERS AND MONTGOMERY WATSON LABORATORY

ORDER NO.: 92-23
REPORT FREQUENCY: MONTHLY
SAMPLE COLLECTED BY: Julie Wilson
SIGNED UNDER PENALTY OF PERJURY: Dale Kaemling

PARAMETER	DATE and TIME SAMPLE		FREQUENCY OF SAMPLE	UNITS	SAMPLE TYPE		SAMPLE VALUE				DAILY MAX. LIMITATION	MONTHLY AVG. LIMITATION
TOTAL DISOLVED SOLIDS	12/2/2009	06:50	MONTHLY	MG/L	24 HOUR COMPOSITE		890				1600	1376
CHLORIDES	12/2/2009	06:50	"	"	"		230				532	440
MANGANESE	12/2/2009	06:50	"	"	"	<	0.002				0.09	0.03
SULFATE	12/2/2009	06:50	"	"	"		250				540	451
FLUORIDE	12/2/2009	06:50	"	"	"		0.660				1.2	0.8
IRON	12/2/2009	06:50	"	"	"	<	0.020				0.6	0.2
BORON	12/2/2009	06:50	"	"	"		0.370				0.8	0.7
PERCENT SODIUM	12/2/2009	06:50	"	%	"		50				61	59
MBAS	12/2/2009	06:50	"	MG/L	"		0.770				0.7	0.3
TOTAL NITROGEN (as N)	12/2/2009	06:50	"	"	"		18.0				22	12-month running avg. limit 9.4
ELECTRO-CONDUCTIVITY	12/2/2009	06:50	"	dS/m	"		1.50				N/A	N/A
pH	12/2/2009	06:50	WEEKLY	pH	GRAB	6.9	6.9	6.8	6.8		6-9	
											7-day average	30-day average
BIOCHEMICAL OXYGEN DEMAND	2,9,16,23		"	MG/L	"	3	3	5	9		45	30
SUSPENDED SOLIDS TOTAL	2,9,16,23		"	"	"	0	3	2	0		45	30
SUSPENDED SOLIDS VOLATILE	2,9,16,23		"	"	"	0	3	2	0			

DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILITY

REPORT FOR: Wednesday, December 02, 2009 **DUE DATE:** 2/1/10

EXACT SAMPLE POINT:: R.W.C.W.R.F. FACILITY/EFFLUENT

SAMPLE ANALYZED BY: ALMA ORTEGA-CARRILLO / J.SWIGGERS AND MONTGOMERY WATSON LABORATORY

ORDER NO.: 92-25

REPORT FREQUENCY: MONTHLY

SAMPLE COLLECTED BY: Julie Wilson

SIGNED UNDER PENALTY OF PERJURY:

PARAMETER	DATE and TIME SAMPLE	FREQUENCY OF SAMPLE	UNITS	POTABLE SAMPLE VALUE WATER SUPPLY	REQUIRED 30 DAY AVERAGE	DAILY MAX. LIMITATION	SAMPLE VALUE EFFLUENT
TOTAL DISOLVED SOLIDS	12/2/2009 06:50	MONTHLY	MG/L	600	400{1}a MG/L	450{1}b MG/L	890
CHLORIDES	12/2/2009 06:50	"	"	99	200{2}a MG/L	250{2}b MG/L	230
SULFATE	12/2/2009 06:50	"	"	210	100{3}a MG/L	150{3}b MG/L	250

{1} a. This is a 12-month running average maximum increment of TDS in effluent over potable water supply
b. This is a daily maximum increment of TDS in effluent over potable water suply
c. The daily maximum of TDS in effluent shall not exceed 1,600 mg/L
d. The 12-month running average of TDS in effluent shall not exceed 1376 mg/L
{2} a. This is a 12-month running average maximum increment of Chlorides in effluent over potable water supply
b. This is a daily maximum increment of Chlorides in effluent over potable water supply
c. The daily maximum of Chlorides in effluent shall not exceed 552 mg/L
d. The 12-month running average of Chlorides in effluent shall not exceed 440 mg/L
{3} a. This is a 12-month running average maximum increment of Sulfate in effluent over potable water supply
b. This is a daily maximum increment of Sulfate in effluent over potable water supply
c. The daily maximum of Sulfate in effluent shall not exceed 540 mg/L
d. The 12-month running average of Sulfate in effluent shall not exceed 451 mg/L (pg.12)

MONTHLY EFFLUENT MONITORING REPORT
DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT

ORDER 92-25

PLANT SUPERVISOR: _____ MONTH/YEAR: Tuesday, December 01, 2 DUE: 2/1/10

DATE	TREATMENT PLANT FLOW DAILY MGD	EFFLUENT DISOLVED OXYGEN DAILY mg/l	TURBIDITY CONTINUOUS DAILY NTU	COLIFORM DAILY MPN/100 ml.	COLIFORM 7 DAY MEDIAN MPN/100 ml.
12/1/2009	1.2518	7.8	1.10	<2	----
12/2/2009	1.2962	7.7	1.00	<2	----
12/3/2009	1.28782	7.6	1.00	<2	----
12/4/2009	1.3144	8.0	1.00	<2	----
12/5/2009	1.1805	8.0	1.20	<2	----
12/6/2009	1.2078	7.5	1.20	<2	----
12/7/2009	1.2818	7.4	1.50	<2	----
12/8/2009	0.9079	8.7	Plant Off Line	<2	----
12/9/2009	0.9974	8.2	1.70	<2	----
12/10/2009	1.2473	7.9	1.60	<2	----
12/11/2009	1.233	8.3	1.70	<2	----
12/12/2009	1.2722	8.0	1.90	<2	----
12/13/2009	1.0307	7.7	1.80	<2	----
12/14/2009	0.76	8.0	1.40	<1	----
12/15/2009	0.8176	8.1	1.30	<2	----
12/16/2009	0.8651	8.4	1.00	<2	----
12/17/2009	0.4943	8.4	1.00	<2	----
12/18/2009	0.369	8.4	1.50	<2	----
12/19/2009	0.4002	8.5	1.20	<2	----
12/20/2009	0.3985	8.6	0.70	<2	----
12/21/2009	0.2755	8.4	Plant Off Line	<2	----
12/22/2009	0.4697	8.3	0.80	<2	----
12/23/2009	0.5095	8.6	0.60	<2	----
12/24/2009	0.59285	9.4	0.60	<2	----
12/25/2009	0.64255	9.6	0.70	<2	----
12/26/2009	0.6331	9.4	0.80	<2	----
12/27/2009	0.64	9.3	0.80	<2	----
12/28/2009	0.6223	9.0	0.50	<2	----
12/29/2009	0.6416	8.7	0.50	<2	----
12/30/2009	0.6252	9.2	0.50	<2	----
12/31/2009	0.6326	8.6	0.50	<2	----
TOTAL	25.90				
AVERAGE	0.84	8.4	1.07		

(1) The median number of coliform organisms shall not exceed 2.2/100ml.
(2) The number of coliform organisms shall not exceed 23/100ml.
(3) Effluent turbidity must not exceed 5 NTU more than 5% of the time during any 24hour period.

DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT

REPORT FOR: Tuesday, December 01, **DUE DATE:** 2/1/10 **REPORT FREQUENCY:** MONTHLY:

ORDER NO.: 92-25

PLANT SUPERVISOR:

PARAMETER W. A. S.	DATE	VOLUME TO SLUDGE BEDS (GALLONS)	VOLUME TO S. D. METRO SYSTEM (GALLONS)
	12/1/2009	0	72,500
	12/2/2009	0	77,400
	12/3/2009	0	75,300
	12/4/2009	0	78,300
	12/5/2009	0	74,200
	12/6/2009	0	91,500
	12/7/2009	0	85,800
	12/8/2009	0	57,600
	12/9/2009	0	80,200
	12/10/2009	0	97,100
	12/11/2009	0	63,000
	12/12/2009	0	82,700
	12/13/2009	0	101,200
	12/14/2009	0	70,400
	12/15/2009	0	77,700
	12/16/2009	0	95,500
	12/17/2009	0	54,500
	12/18/2009	0	29,500
	12/19/2009	0	50,700
	12/20/2009	0	38,700
	12/21/2009	0	22,100
	12/22/2009	0	18,000
	12/23/2009	0	28,600
	12/24/2009	0	71,900
	12/25/2009	0	61,300
	12/26/2009	0	61,700
	12/27/2009	0	58,900
	12/28/2009	0	71,400
	12/29/2009	0	70,200
	12/30/2009	0	74,500
	12/31/2009	0	71,100
	TOTAL FOR MONTH:	0	2,063,500

DISCHARGER: OTAY WATER DISTRICT - RALPH W. CHAPMAN WATER RECYCLING FACILIT **ORDER NO.:** 92-2

REPORT FOR: Tuesday, December 01, 2 **DUE DATE:** 2/1/10

PLANT SUPERVISOR: **REPORT FREQUENCY:** MONTHLY:

DATE	DRIED SLUDGE TO USE AREA (cu yds)	SCREENINGS TO METRO SYS. (cu yds)	SCRN/SLUDGE TO DRYING BEDS (cu yds)	SCRN/SLUDGE TO USE AREA (cu yds)
12/1/2009	0	0.4	0	0
12/2/2009	0	2.5	0	0
12/3/2009	0	2.4	0	0
12/4/2009	0	2.5	0	0
12/5/2009	0	2.2	0	0
12/6/2009	0	2.3	0	0
12/7/2009	0	2.4	0	0
12/8/2009	0	1.7	0	0
12/9/2009	0	1.9	0	0
12/10/2009	0	2.4	0	0
12/11/2009	0	2.3	0	0
12/12/2009	0	2.4	0	0
12/13/2009	0	1.9	0	0
12/14/2009	0	1.2	0	0
12/15/2009	0	1.5	0	0
12/16/2009	0	1.6	0	0
12/17/2009	0	0.9	0	0
12/18/2009	0	0.6	0	0
12/19/2009	0	0.7	0	0
12/20/2009	0	0.7	0	0
12/21/2009	0	0.4	0	0
12/22/2009	0	0.8	0	0
12/23/2009	0	0.9	0	0
12/24/2009	0	1.1	0	0
12/25/2009	0	1.1	0	0
12/26/2009	0	1.1	0	0
12/27/2009	0	1.1	0	0
12/28/2009	0	1.1	0	0
12/29/2009	0	1.1	0	0
12/30/2009	0	1.1	0	0
12/31/2009	0	1.1	0	0
TOTAL	0	45.4	0	0

December 2009 Report

POTABLE @ 11901 Singer Lane

Sample Date/Time: December 2, 2009 @ 0650

Constituent	Result	Units
TDS (Total Dissolved Solids)	600	mg/L
Chloride	99	mg/L
Sulfate	210	mg/L

RWCWRF Effluent

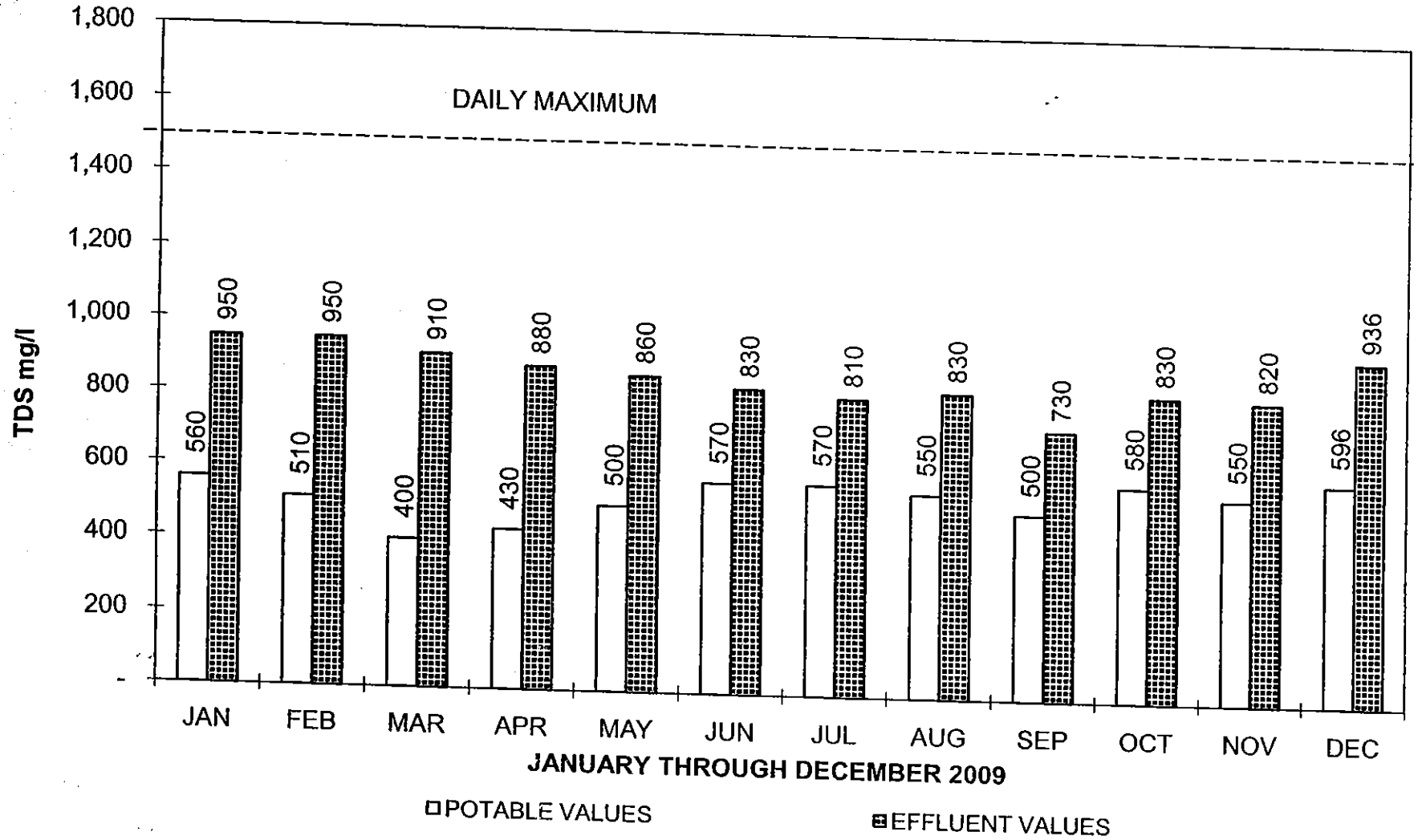
Sample Date/Time: December 2, 2009 @ 0630

Constituent	Result	Units
TDS (Total Dissolved Solids)	890	mg/L
Chloride	230	mg/L
Manganese	ND<0.002	mg/L
Sulfate	250	mg/L
Fluoride	0.66	mg/L
Iron	ND <0.02	mg/L
Boron	0.37	mg/L
% Sodium	50.4	mg/L
MBAS	0.77	mg/L
Total Nitrogen as N	18.0	mg/L
Electroconductivity	1.50	dS/m

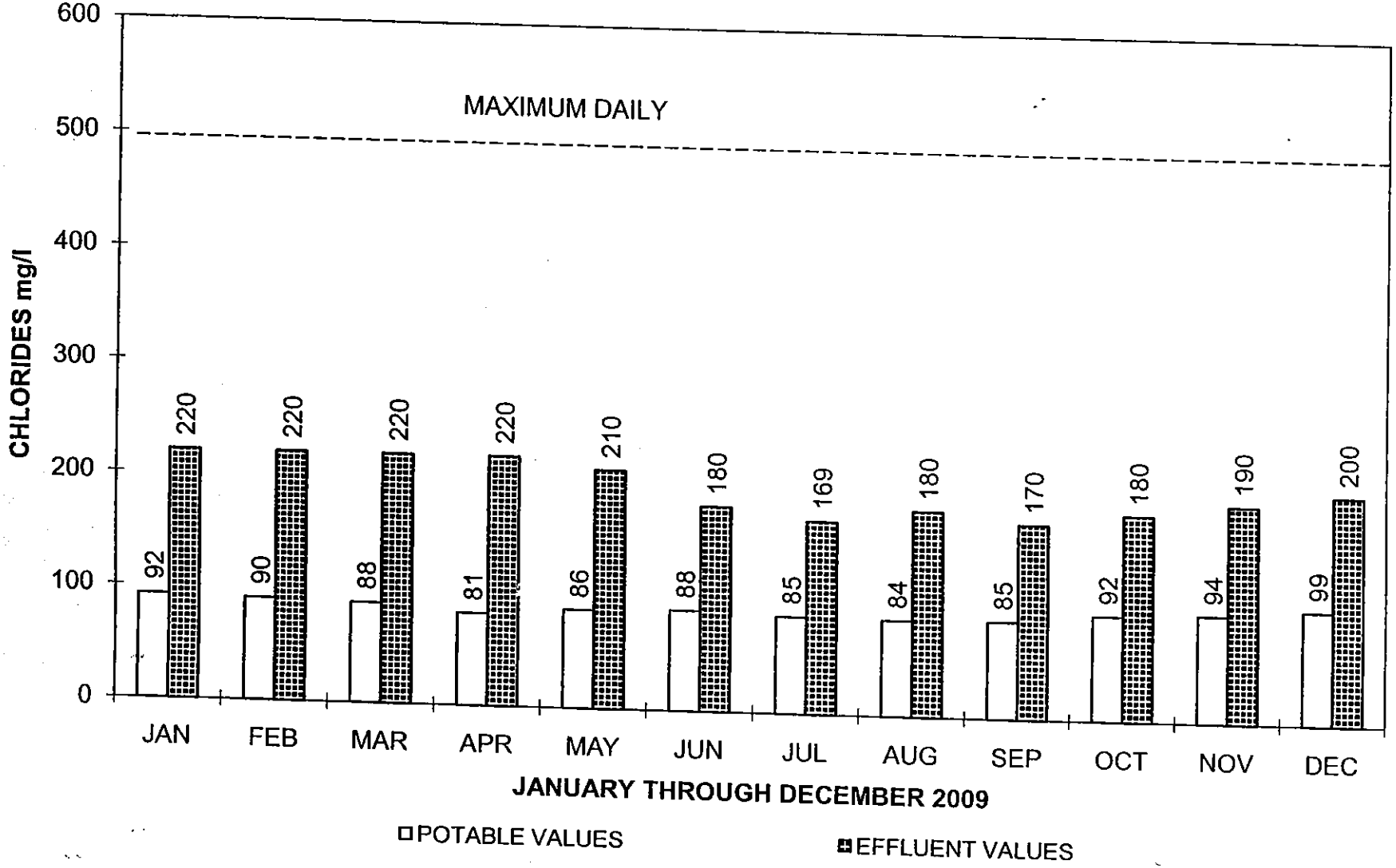
Prepared by A.P. Ortega 01/04/2010

Note: QC data is kept in the original laboratory report (s).

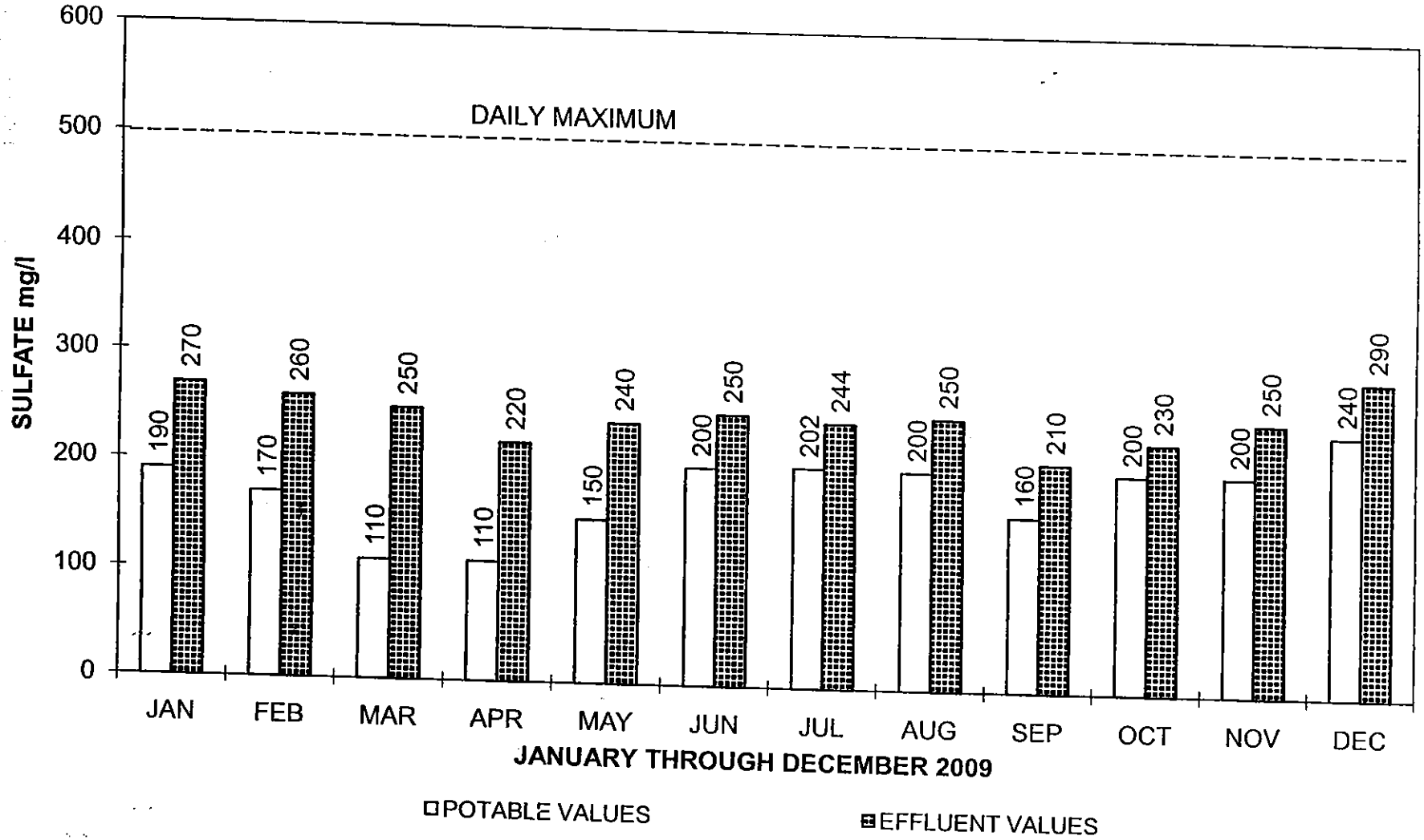
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
TDS



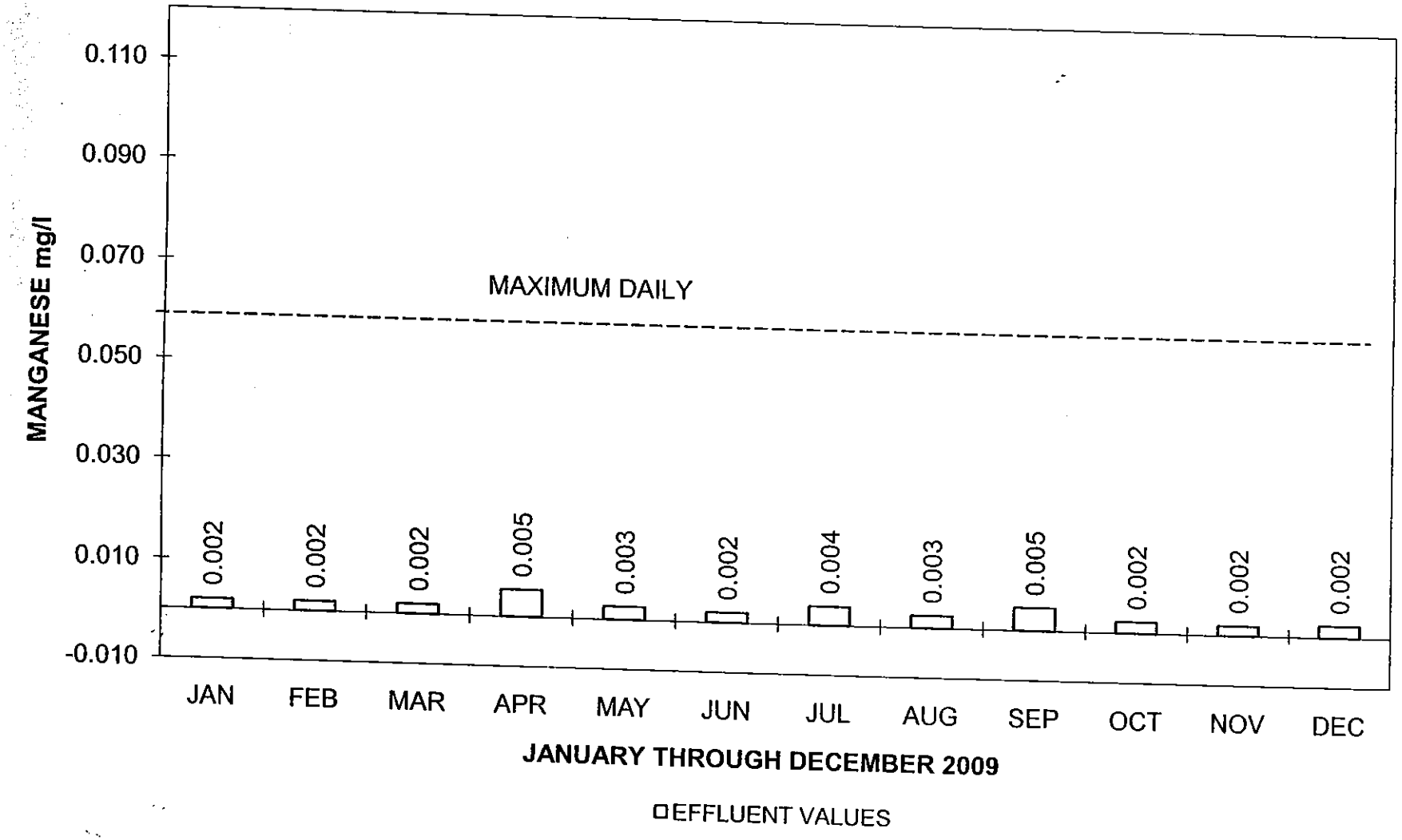
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
CHLORIDES



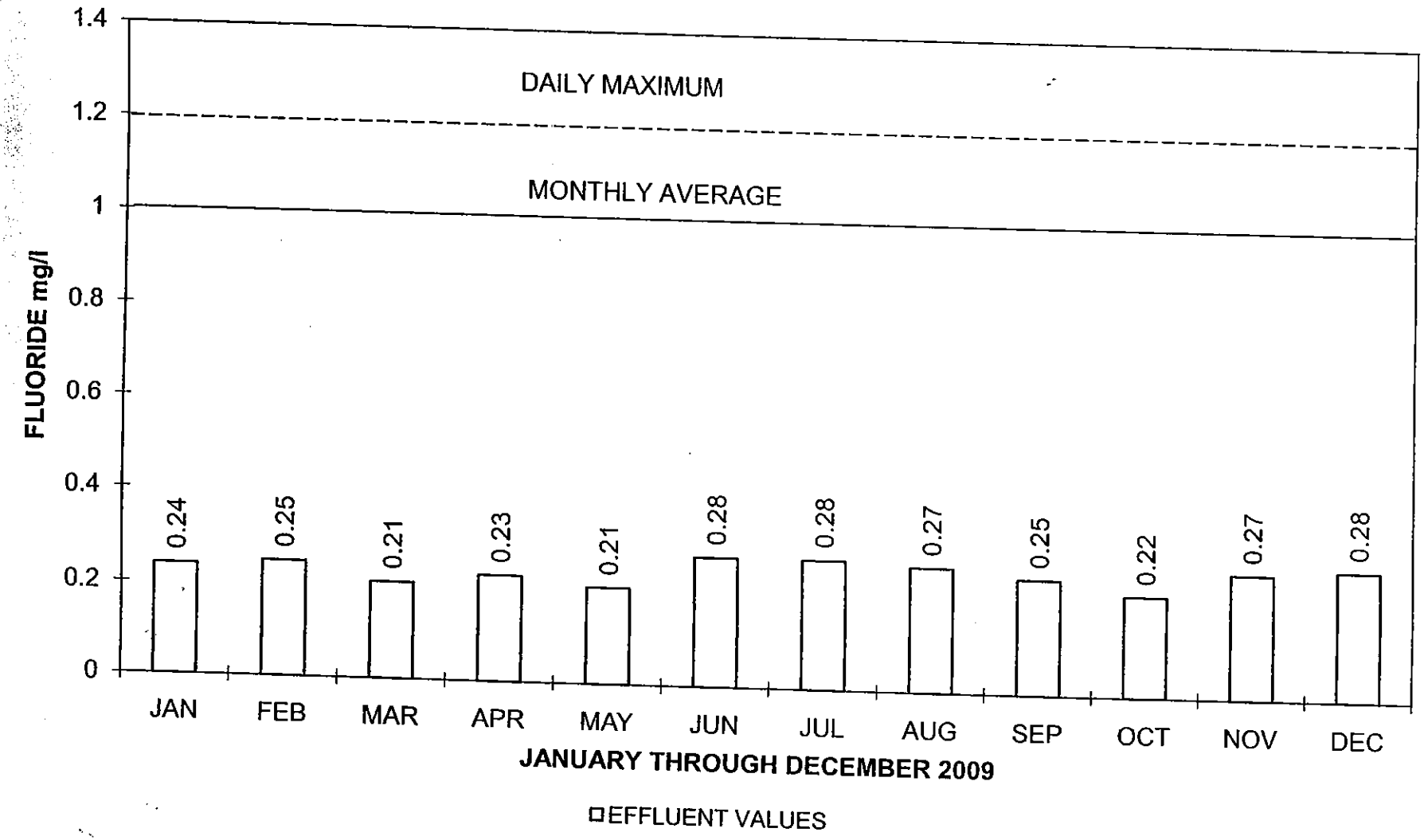
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
SULFATE



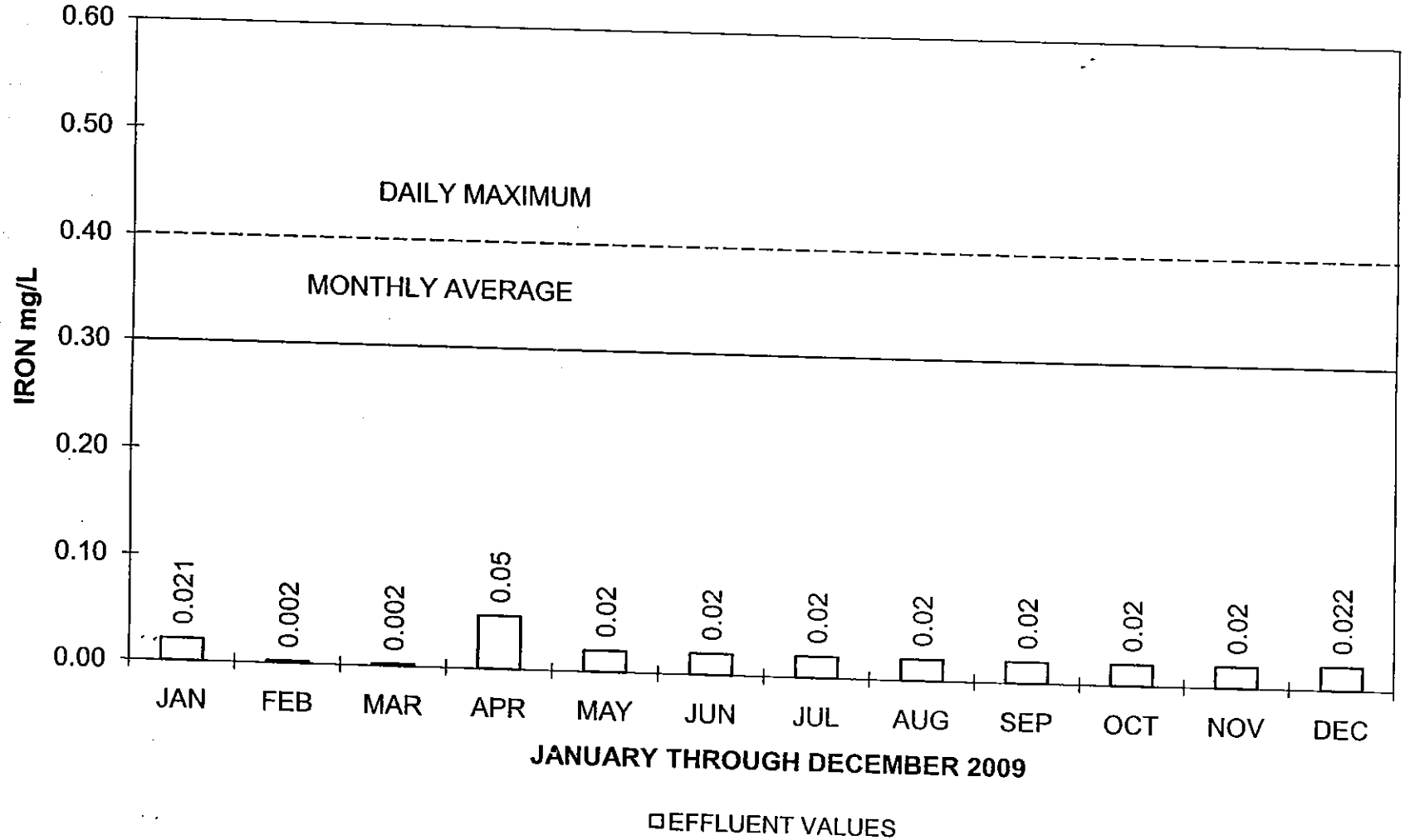
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
MANGANESE



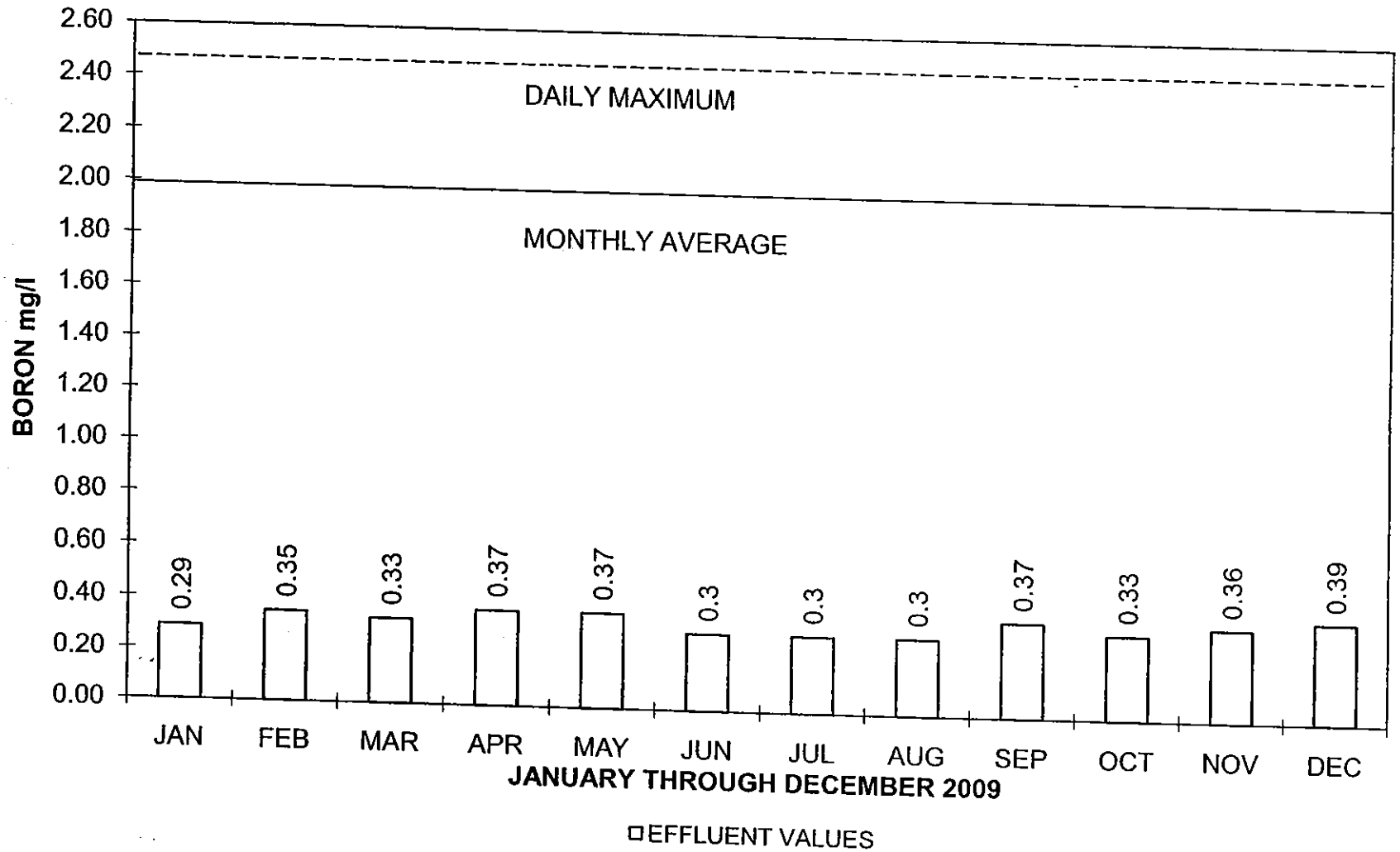
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
FLUORIDES



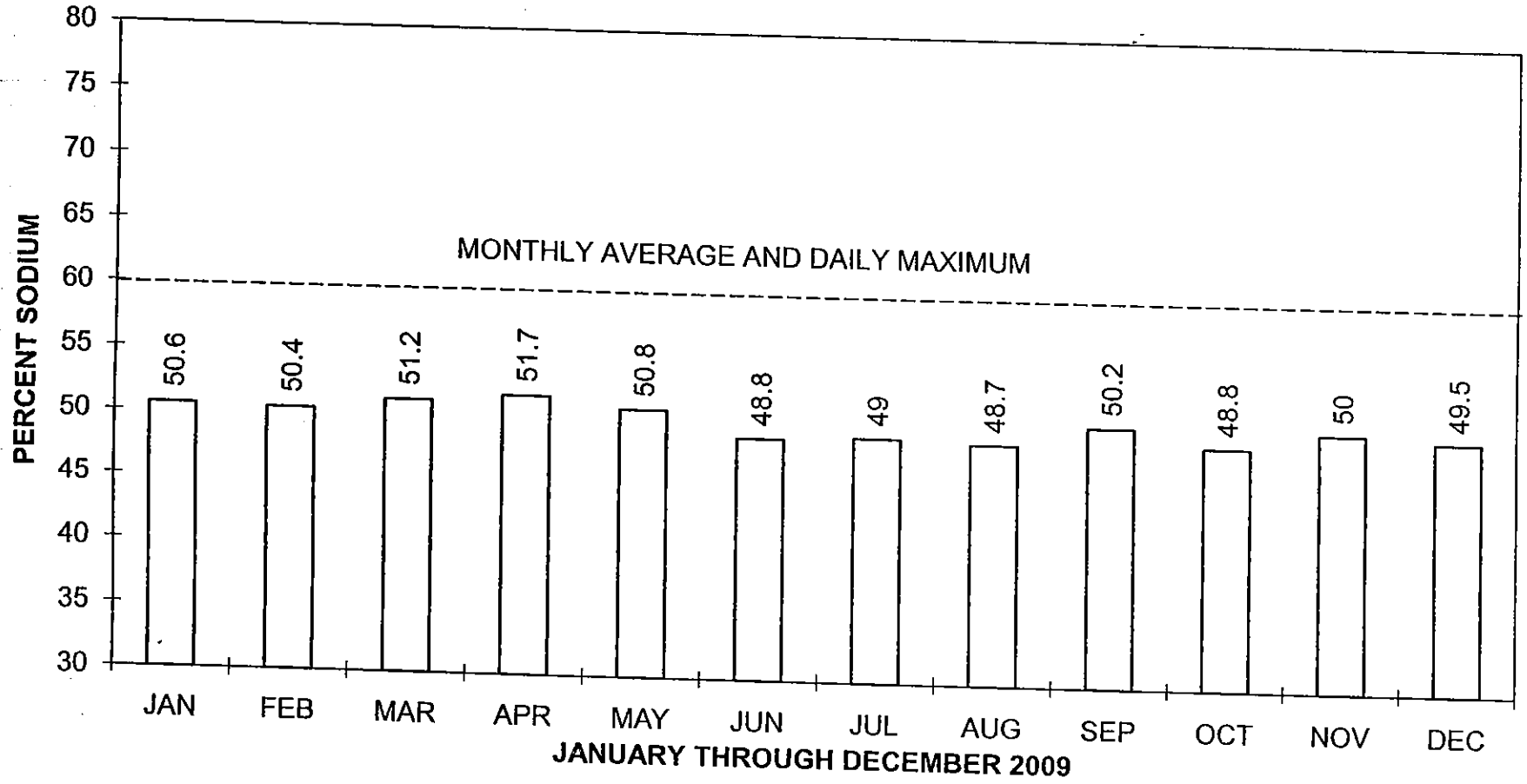
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
IRON



OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
BORON

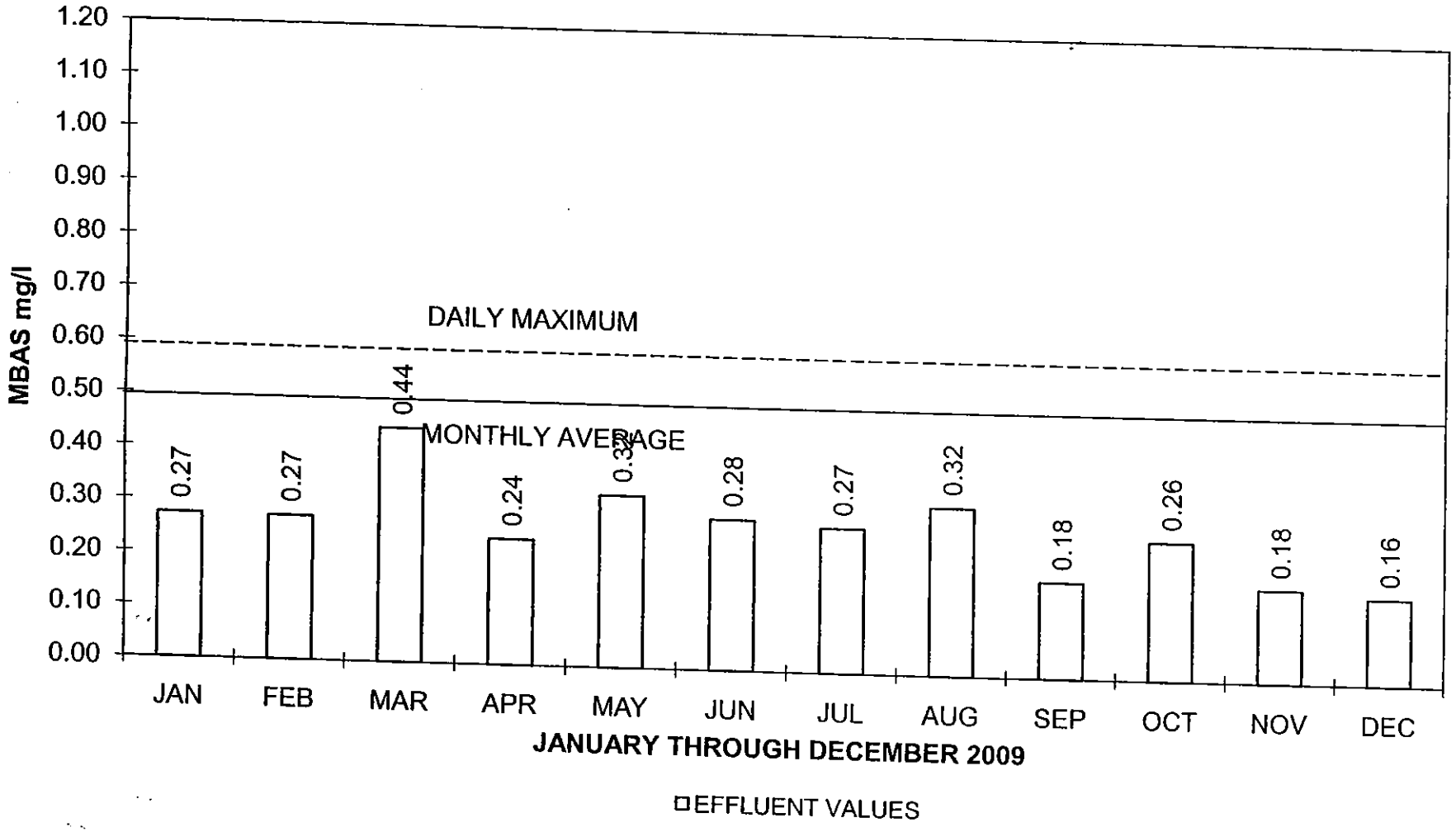


OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
SODIUM

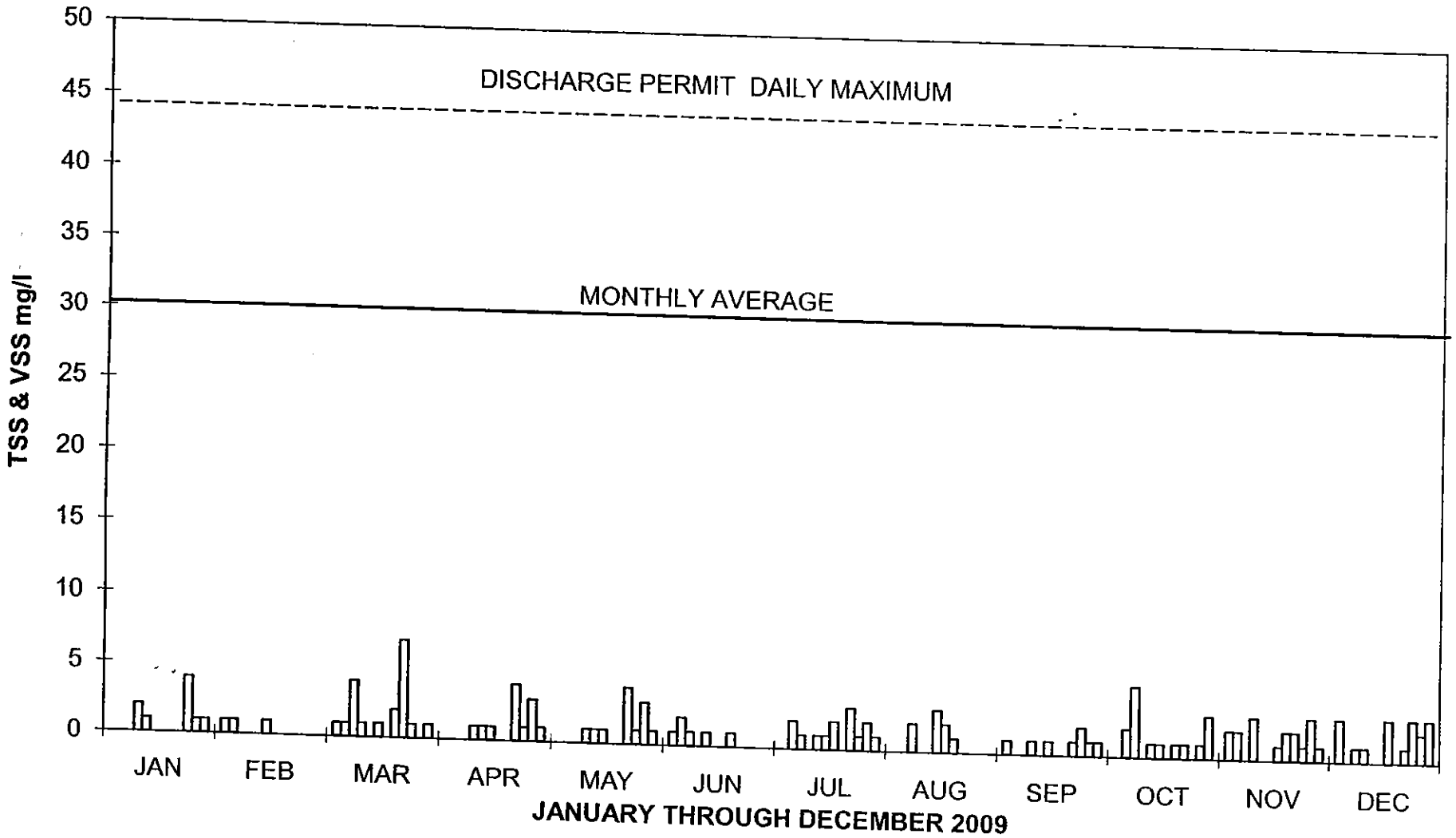


□EFFLUENT VALUES

OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
MBAS

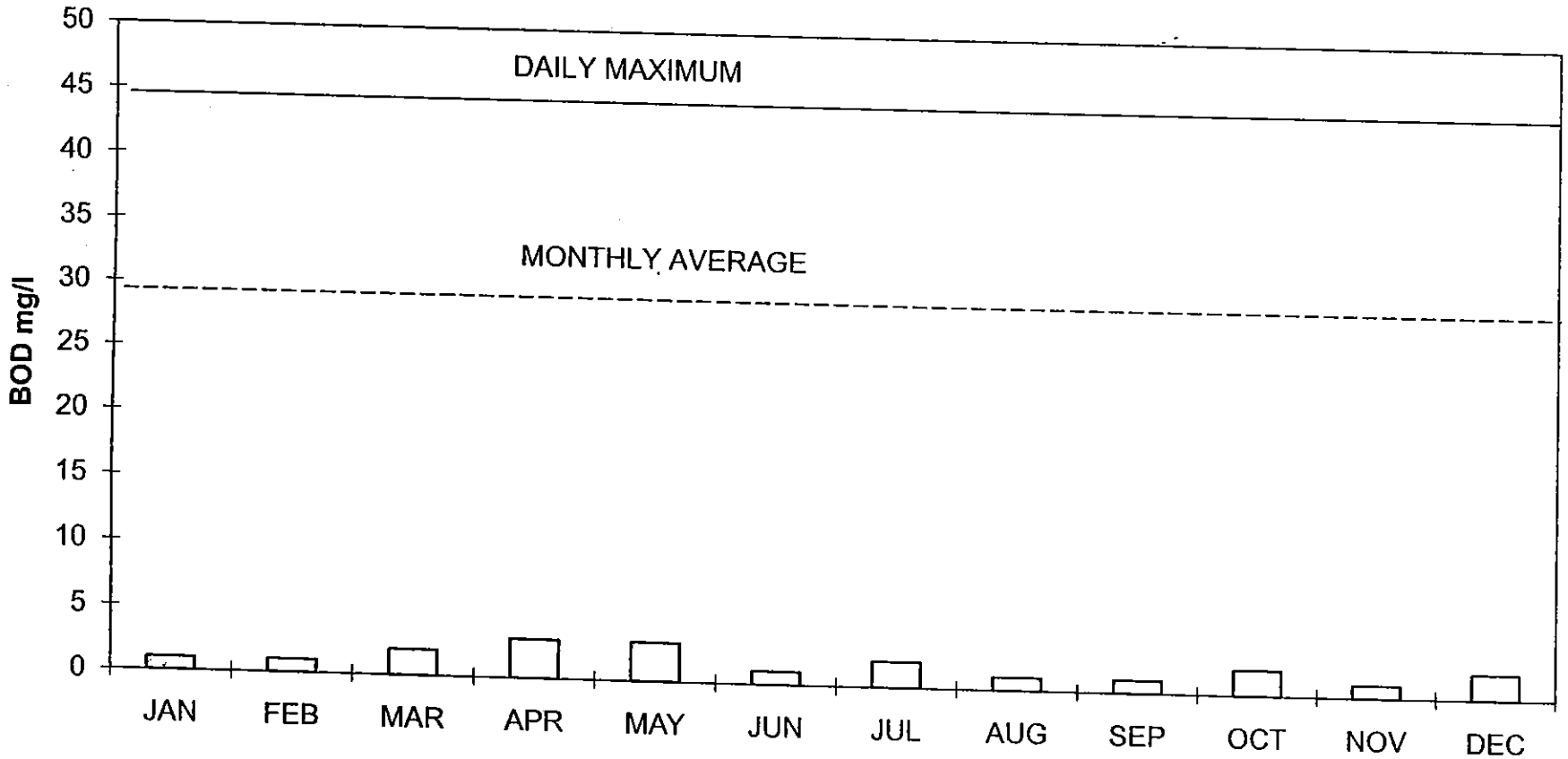


OTAYWATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
TSS & VSS



EFFLUENT VALUES

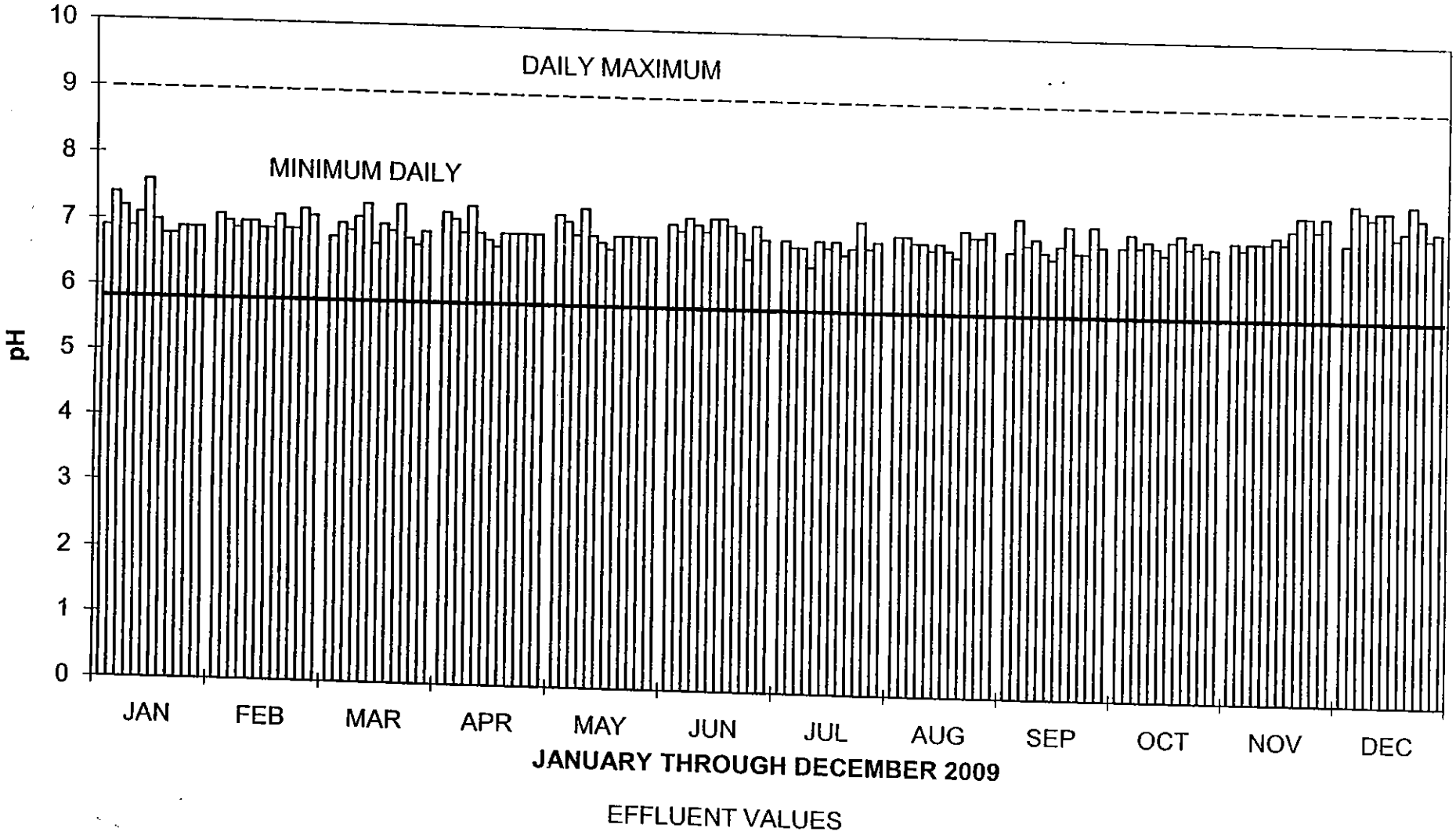
OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
BOD



JANUARY THROUGH DECEMBER 2009

□ EFFLUENT VALUES

OTAY WATER DISTRICT
RALPH W. CHAPMAN WATER RECYCLING FACILITY
pH



EFFLUENT VALUES

RALPH W. CHAPMAN WATER RECYCLING FACILITY
MONTHLY EFFLUENT DATA SUMMARY 2009

ORDER NO.: R9-2007-0038

DATE	TDS	CL	Mn	SO4	F	Fe	B	1X PER WEEK pH	%Na	MBAS	1X PER WEEK BOD	1X PER WEEK TSS/VSS	P-TDS	P-Cl	P-SO4
2/23/2009	(A)							7.5			2	3			
3/11/2009	1020	250	0.002	300	0.6	0.020	0.390	6.8 7.2 7.1 7.0	49	0.54	2 2 2 2	1 1 1 1	648	101	236
4/8/2009	1040	239	0.003	298	0.6	0.300	0.370	7.1 7.3 5.3 7.3	48	0.59	2 2 3 3	0 2 3 7	661	96	241
5/6/2009	912 (B)	210	0.007	260	0.7	0.020	0.400	7.3 6.9 7.2	49	0.39	3 5 3	3 3 1	584	96	210
7/15/2009	913	210	0.004	230	0.6	0.064	0.380	7.7 7.1 7.1	49	0.29	2 2 2	1 1 2	586	96	180
8/11/2009	930	220	0.002	230	0.7	0.021	0.400	6.8 6.7 6.7 6.7	50	0.22	2 2 2 2	2 2 2 1	590	110	200
9/2/2009	920	220	0.004	230	0.7	0.020	0.370	6.8 6.7 6.7 6.7	52	0.22	2 2 2 2	2 2 2 1	520	94	190
10/1/2009	890	230	0.004	240	0.7	0.020	0.370	6.9 6.9 6.8 6.9	51	0.50	2 3 5 2	1 0 1 1	580	99	200
11/5/2009	770	220	0.003	190	0.7	0.020	0.370	7.0 6.8 6.9 6.9	51	0.27	3 8 3 4	1 1 1 1	470	99	150
12/2/2009	890	230	0.002	250	0.7	0.020	0.370	6.9 6.9 6.8 6.8	50	0.77	3 3 5 9	0 3 2 0	600	99	210

(A) The plant was offline from 12/31/08 until 2/17/09. One weekly sample was collected during the (12) days of operation in Feb. 2009. No monthly sample analysis was performed in Feb. 2009.

(B) The plant was off line in June for planned maintenance. (May 30TH – July 10TH)

REPORT AS OF: 2/11/2010

Appendix I-3 – DESCP

Preliminary Draft

Drainage, Erosion, and Sediment Control Plan

Pio Pico Energy Center

San Diego County, California

Submitted to the:
California Energy Commission

Submitted by:
Pio Pico Energy Center
With Technical Assistance by:
Kiewit Power
Lenexa, Kansas
January 2011

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APPENDICES

Appendix A: Drawings

1. Grading Plan P009-041-CG-001
2. Storm Water Plan 2009-041-CM-005
3. Best Management Practices Plan 2009-041-CM-006
4. Vicinity Map 2009-041-CM-200
5. Site Delineation Map 2009-041-CM-201
6. Watercourses and Critical Areas Map 2009-041-CM-202

Appendix B: Drainage Calculations and Maps

1. Drainage Calculations
2. Pre-Development Drainage Map P009-041-CM-002
3. Post-Development Drainage Map P009-041-CM-003

Appendix C: Pre-Development Drainage Study by Alta Consultants

SECTION 1: Introduction

This Preliminary Draft Drainage, Erosion, and Sediment Control Plan (DESCP) has been prepared in anticipation of the California Energy Commission's (CEC) approval of the proposed Pio Pico Energy Center (Pio Pico) Project. The project is a simple-cycle electrical generating facility that is located in an unincorporated area of San Diego County, California.

This draft DESCP is preliminary because it is prepared in advance of the final phase of construction planning and engineering design, during which the details regarding construction schedule and certain aspects of erosion control design will be finalized. This will take place after licensing and will be included in a future draft of the DESCP. Detailed maps at 1"=100' will be developed and included in the final DESCP.

1.1 Drainage, Erosion, and Sediment Control Plan Elements

This draft DESCP includes the following elements:

Vicinity Map: A map is provided indicating the location of all project elements (construction site, laydown area, etc.) with depictions of all significant geographic features.

Site Delineation Map: All areas subject to soil disturbance for the Pio Pico project (project site, laydown area, all linear facilities, and any other project elements) are delineated showing boundary lines of all construction/demolition areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.

Watercourses and Critical Areas Map: The DESCP shows the location of all nearby watercourses including swales, intermittent streams, and drainage ditches, as well as their proximity to the Pio Pico project. The map shows the watercourses near the project and the area in which the project is located.

Drainage Map: The DESCP provides a topographic site map showing all existing, interim and proposed drainage systems. Drainage area boundaries are found on the Pre and Post-Development Drainage Maps in Appendix B.

Narrative of Project Site Drainage: The DESCP includes a narrative of the drainage measures to be taken to protect the site and downstream facilities. The narrative provides summary tables from hydrologic and hydraulic calculations contained in Appendix B and includes watershed sizes in acres.

Grading Plan: The DESCP provides elevations, slopes, locations, and the extent of all proposed grading as shown by the contours. Existing and proposed topography are shown tying together.

Clearing and Grading Narrative: The DESCP includes quantities of material excavated and filled for the site and all project elements whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported.

Best Management Practices Plan: The DESCP describes the location, timing, and maintenance schedule of BMPs to be used. Final design and placement of the BMPs will take place during the final phase of construction planning after licensing.

Best Management Practices Narrative: The DESCP shows the location (as identified above), timing, and maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading, during all project element excavations and construction, final grading/stabilization, and post-construction. Separate BMP implementation schedules will be provided for each project element for each phase of construction and also the post-construction maintenance for structural BMPs once detailed design is completed.

1.2 Project Overview

Pio Pico will be located on approximately 9.99 acres of Parcel 6480404500 in an unincorporated portion of San Diego County, CA. The site is immediately west of Calpine's Otay Mesa Energy Center. This location is on the southeast corner of the intersection of Alta Road and Calzada De La Fuente (Energy Center Way.) The project will comply with all local, state, and federal regulatory requirements associated with the protection of water quality and soil resources. See Drawing CM-200 for the Vicinity Map and Drawing CM-201 for the Site Delineation Map in Appendix A.

1.3 Watercourses and Critical Areas

The project is located within the Otay River Watershed. The Upper and Lower Otay Reservoirs are located north of the project. Both serve as a supply for drinking water to the San Diego area. The Otay River is located northwest of the project. It acts as an intermittent stream only flowing part of the year. This river is fed by the Upper and Lower Otay Reservoirs as well as the surrounding watershed and outlets to the San Diego Bay. The site discharges to intermittent streams that flow through the Johnson Canyon and onto the Otay River. The point of discharge into the Otay River is downstream from the Otay Reservoirs. See Drawing CM-202 for the Watercourses and Critical Areas Map in Appendix A.

1.4 Project Ownership

The facility will be owned by Pio Pico Energy Center, LLC.

1.5 Local Ordinances & Standards

Drainage design for the project shall be in accordance with the following local Standards:

- San Diego County Watershed Protection Program
- San Diego County Stormwater Standards Manual
- San Diego County Drainage Design Manual
- San Diego County Hydrology Manual
- San Diego County Grading Ordinance

SECTION 2: Drainage

Existing Project Site

Prior to construction, the Pio Pico project site will be graded by the industrial park developer in accordance with the drainage study provided in Appendix C of this document. Drawing number P009-041-CM-002, Pre-development Map, included in Appendix B of this document shows the PPEC site's topography as anticipated after the developer completes the grading plan. Elevation at the project site will be approximately 635 feet above mean sea level (msl) once the grading is completed. A detention pond will be located in the northwest corner of the site. The pond shall have an approximate volume of 52,000 cubic feet with a bottom-of-pond elevation at 622.70. Flow from the pond is controlled by a discharge structure constructed of 48" diameter corrugated metal pipe. The structure contains (2) 1.5" diameter orifices located at bottom-of-pond elevation 622.70, (4) 8.5" diameter orifices located at elevation 626.15, and an open top with trash rack set at elevation 628.63'. The pond outlet structure discharges to a 30" diameter reinforced concrete pipe that runs north at 0.5% slope and connects to an existing drainage system under Calzada De La Fuente (Energy Center Way) and eventually drains to the Otay River. The vicinity maps show detention ponds north of the proposed facility. These ponds are part of the drainage system that the site will discharge into. They will be developed by other parties prior to construction of the PPEC facility and are not included in the scope of the PPEC project.

The parcel to the south of the main project site will be used for construction lay-down and will be graded similarly prior to construction by the developer. The ground will be graded to slope at 1% to a detention pond located in the southwest corner of the site. The pond shall have an approximate volume of 45,000 cubic feet and a bottom elevation of 618.00. Flow from the pond is controlled by a 48" diameter corrugated metal pipe discharge structure. The structure contains (2) 1.5" diameter orifices located at bottom-of-pond elevation 618.00, (2) 3.45' tall by 1.18' slots at elevation 621.54, and an open top with trash rack set at elevation 622.71'. The pond outlet structure discharges to a 24" diameter reinforced concrete pipe that runs south at 0.5% slope and connects to an existing drainage system under Paseo De La Fuente (Lone Star Road).

The existing condition of the site (predeveloped pond and outlet structure) is based upon a drainage study performed by Alta Consultants (shown in Appendix C of this document.) The study conservatively assumes both parcels to have an overall runoff coefficient of 0.87. For a 100-year storm, the existing drainage system of the northern site parcel was designed to outflow at a peak discharge rate of 11.96 CFS while the southern parcel has a design peak outflow of 28.20 CFS. This will serve as the predevelopment condition for this drainage study.

The existing site is currently outside of the 100-year floodplain. The proposed facility will continue to be outside the 100-year floodplain.

Proposed Project Site

The proposed facility is 9.99 acres in area with an adjacent 6.00 acre laydown area to the south. Stormwater runoff will be routed away from plant equipment by means of an underground drainage system and ditches around the site. Underground pipes within the system are sloped at an approximate rate of 0.5%. The runoff will accumulate in the pre-developed detention pond in the northwest corner of the site before draining to an existing stormwater system. See Drawing CG-001 for Grading Plan and Drawing CM-205 for Storm Water Plan in Appendix A.

The maximum side slope for cut and fill within the facility area is 2:1 (H:V). Slopes shall have slope protection to mitigate the potential of erosion. See Drawing CM-208 for a Post-Development Drainage Map in Appendix B.

Approximately 2.80 acres, or 29%, of the proposed facility will be impervious. Finished grade around all equipment foundations within the plant loop road have been set to an elevation of 635.00 feet. Top of concrete shall be at least six inches above finished grade. In the vicinity of the plant loop road, runoff is conveyed to the detention basin through shallow swales, area inlets, and storm sewers. The detention basin will be utilized to allow the quantity and quality of storm water runoff from the power blocks to be at or below the pre-development levels.

The switchyard east of the power block is sloped to allow runoff to sheet flow away without ponding. The areas outside of the plant loop road are graded with shallow-sloped swales to divert runoff away from equipment.

Rainfall data was compiled from NOAA's Hydrometeorolgical Design Studies Center website, http://hdsc.nws.noaa.gov/hdsc/pfds/index.html. Isopluvial maps from NOAA Atlas 2 Volume XI-California were used in determining the 6 and 24-hour rainfall events for the 2, 5, 10, 25, 50, and 100-year events.

All drainage facilities have been sized to discharge the 100-year, 24-hour storm event without flooding the facility. See Appendix B for Pre and Post-Development Drainage calculations.

Storm sewer systems were designed using Hydraflow Storm Sewers 2005 using the same design criteria as stated above.

The Rational Method was used to determine the pre and post-development discharges for both off-site and on-site storm water runoff. Hydrologic soil groups and runoff coefficients were determined using the USDA's Web Soil Survey and the preliminary geotechnical report. Hydraflow Hydrographs 2007 Version 9.23 by Intelisolve was used for calculating runoff discharges, volumes, and pond routing calculations.

Table 2.1, Hydrologic Analyses for Pre-Development and Post-Development Conditions, shows precipitation and discharge data for the 10-year and 100-year, 24-hour storm events for pre-development and post-development conditions for the project site. The table shows that the average runoff coefficient for the post-development facility is actually lower than the assumed value in the pre-development study. It should be noted the current design approach is based on preliminary assumptions and may require modifications during the final design; however, the design concept will remain the same.

All calculations contained within the DESCP are preliminary and do not necessarily reflect final as-built conditions. If approved, drainage design for the facility will be performed by a professional engineer licensed in the state of California in accordance with all local, state, and federal regulations.

Table 2.1
Hydrologic Analyses for Pre-Development and Post-Development Conditions

	Proposed Facility Pre-Development	Proposed Facility Post-Development
Area (AC)	9.75	9.75
Average Runoff Coefficient	0.87	0.77
Precipitation –10-Year, 24 hour Storm (in.)	3.0	3.0
Precipitation –100-Year, 24 hour Storm (in.)	4.5	4.5
Peak Discharge into Detention Pond - 10-Year Storm (cfs)	30.95	21.36
Peak Discharge into Detention Pond - 100-Year Storm (cfs)	50.18	39.37
Peak Discharge from Detention Pond - 10-Year Storm (cfs)	N/A*	1.39
Peak Discharge from Detention Pond - 100-Year Storm (cfs)	11.96	6.80

Note:
AC = Acres
in. = Inches
cfs = Cubic Feet per Second

* *Predevelopment drainage study only calculated flow rate from pond for 100-year storm.*

SECTION 3: Clearing and Grading

3.1 Areas to be Cleared and Graded

The proposed facility is located on light brush and exposed soil. Brush and top soil shall be cleared during pre-development activities.

3.2 Location of Disposal Areas, Fills, or Other Special Areas

It is anticipated all excavated soil will be used on-site for grading and leveling purposes. In the event that some of the excavated soil will not be reused onsite, classification of the soil for disposal shall be made on the basis of sampling. Sampling shall be completed once the soil is excavated and stockpiled. Soil which is determined to be non-hazardous may be suitable for reuse at a nearby construction site or disposal at a regional disposal facility, depending on the chemical quality.

3.3 Existing and Proposed Topography

The existing site depicts an average slope of 1.0% to the northwest. At completion of the proposed facility, finished grade around most equipment foundations and the plant loop road will be set at a crown elevation of 635.00. Surface grading within the plant loop road will direct storm water runoff to a detention basin at the northwest corner of the site via shallow swales and storm sewers. The remainder of the proposed facility will be graded to effectively drain runoff away from equipment and the project site.

SECTION 4: Best Management Practices

The project shall be scheduled to minimize impact on the environment by limiting the amount of exposed, untreated soil. Final grading and surfacing shall be completed as soon as feasible to limit the exposure of soils. Construction is expected to proceed as expediently and efficiently as possible, thereby ensuring as little soil is exposed for as short a time as possible. The following sections present standard construction Best Management Practices (BMPs) which are described in the California Storm Water BMP Handbook (2003). These resource handbooks provide comprehensive details on BMP implementation and will be obtained and reviewed by managers for all construction contractors that may have an impact on implementation of the DESCP.

There are six groups of BMP categories: Erosion Control, Sediment Control, Tracking Control, Wind Erosion Control, Non-Storm Water Management, and Waste Management and Materials Pollution Control. Each section below presents the recommended construction BMPs for stormwater pollution prevention in the proposed facility and laydown area. The DESCP will be updated during detailed design to reflect each BMP to be utilized during each construction phase. While performing the work, the contractors may implement additional control measures if necessary. Personnel will receive training on installing and maintaining BMPs. All BMPs are shown on Drawing CM-205 in Appendix A.

A Construction Storm Water Sampling and Analysis Plan will also be developed as part of the Storm Water Pollution Prevention Plan (SWPPP) to ensure performance standards and monitor the effectiveness of BMPs. This plan will address the timing and methods of such measures, as well as reporting and response requirements. Personnel associated with or specifically assigned to the implementation and maintenance of BMPs will receive training to inspect, maintain, recognize and report abnormal/adverse situations so they can be quickly corrected. An expected schedule of construction activities is shown below in Table 4.1.

Table 4.1
Expected Schedule of Construction

Construction Activity	Date
Rainy Season Begins	October 2012 (Typical)
Site Mobilization	February 2013
BMPs In Place	February 2013
Construction Begins	February 2013
Rainy Season Ends	April 2013 (Typical)
Startup and Testing	March 2014
BMPs Removed	March 2014
Commercial Operation	April 2014

4.1 Erosion Controls

Erosion control BMPs protect the soil surface by covering and/or binding soil particles. This project will implement the following practices for effective temporary and final erosion control during construction:

- Preserve existing vegetation when feasible
- Apply temporary erosion control to remaining active and non-active areas as required by the California Stormwater BMPs Handbook-Construction. Reapply as necessary to maintain effectiveness.

- Implement erosion control prior to the defined rainy season. Implement temporary erosion control measures at regular intervals throughout the defined rainy season.
- Stabilize non-active areas as soon as feasible after the cessation of construction activities.
- At completion of construction, permanent erosion control will be applied to all remaining disturbed soil areas.

The following are erosion control measures that will be used during various phases of the project:
- EC-1, Scheduling
- EC-2, Preservation of Existing Vegetation
- EC-5 Soil Binders
- EC-9, Earth Dikes and Drainage Swales
- EC-10, Velocity Dissipation Devices

4.2 Sediment Controls

Sufficient quantities of temporary sediment control materials will be maintained on-site throughout the duration of the project, to allow implementation of temporary sediment controls in the event of predicted rain, and for rapid response to failures. Sediment controls will be implemented during the rainy and non-rainy season according to BMP specifications. All inlets will be protected until work is completed and final controls and surfacing is in place.

The following are sediment control measures that will be used during various phases of the project:
- SE-1, Silt Fence
- SE-2, Sediment Basin
- SE-4, Check Dams
- SE-5, Fiber Rolls
- SE-7, Street Sweeping and Vacuuming

4.3 Tracking Controls

Tracking controls will be implemented to reduce sediment from entering public or private roads.

The following are tracking control measures that will be used during various phases of the project:
- TC-1, Stabilized Construction Entrance/Exit
- TC-3, Entrance/Outlet Tire Wash
- SE-7, Street Sweeping and Vacuuming

4.4 Wind Erosion Controls

Wind erosion controls will be implemented to control dust from the construction site.

The following are wind erosion control measures that will be used during various phases of the project:
- NS-1, Water Conservation Practices
- WE-1, Wind Erosion Control
- WM-3, Stockpile Management

4.5 Non-Storm Water Controls

Non-Storm Water controls will be implemented to reduce pollution for construction activities.

The following BMPs will be used to control non-storm water pollution on the construction site:

- NS-1, Water Conservation Practices
- NS-3, Paving and Grinding Operations
- NS-6, Illicit Connection/Discharge
- NS-8, Vehicle and Equipment Cleaning
- NS-9, Vehicle and Equipment Fueling
- NS-10, Vehicle and Equipment Maintenance
- NS-12, Concrete Curing
- NS-13, Concrete Finishing

4.6 Waste Management and Materials Pollution Controls

Various chemicals will be stored and used during the construction and the operation of the Pio Pico project.

The following BMPs will be used to handle materials and control construction site wastes:

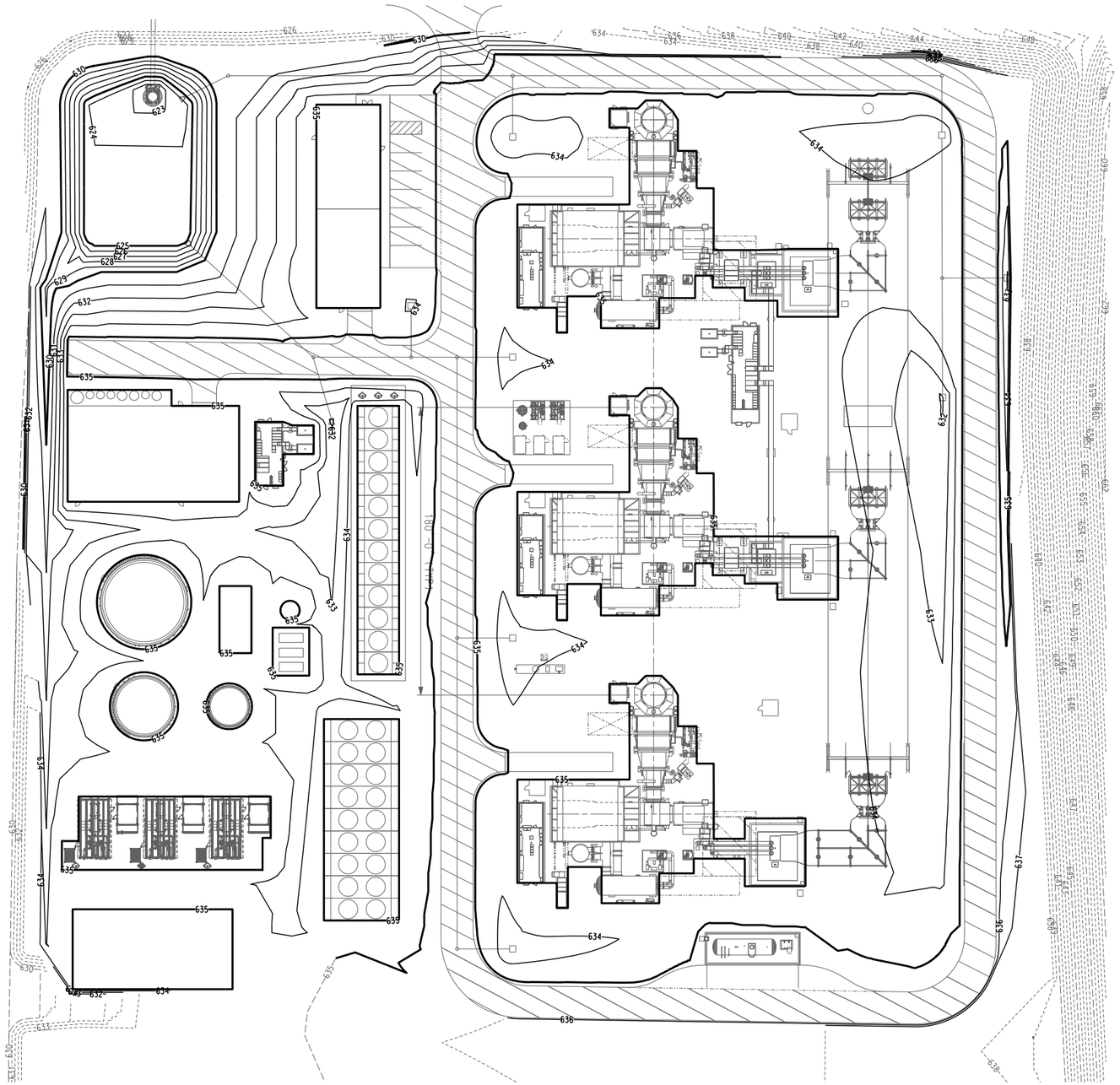
- WM-1, Material Delivery and Storage
- WM-2, Material Use
- WM-3, Stockpile Management
- WM-4, Spill Prevention and Control
- WM-5, Solid Waste Management
- WM-6, Hazardous Waste Management
- WM-8, Concrete Waste Management
- WM-9, Sanitary/Septic Waste Management

Appendix A:

Drawings

NOTES:

1. ALL SLOPES STEEPER THAN 3:1(H:V) SHALL HAVE EROSION PROTECTION.
2. PERMANENT PLANT AREA: 9.99 AC.
3. PERMANENT PLANT VOLUME: CUT 6,152 CY; FILL 11,925 CY



40 0 40 80
SCALE IN FEET
SCALE: 1" = 40'-0"

N

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A	ISSUED FOR REVIEW			
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PIO PICO ENERGY CENTER

3 x GE LMS100
SAN DIEGO COUNTY, CALIFORNIA

Kiewit

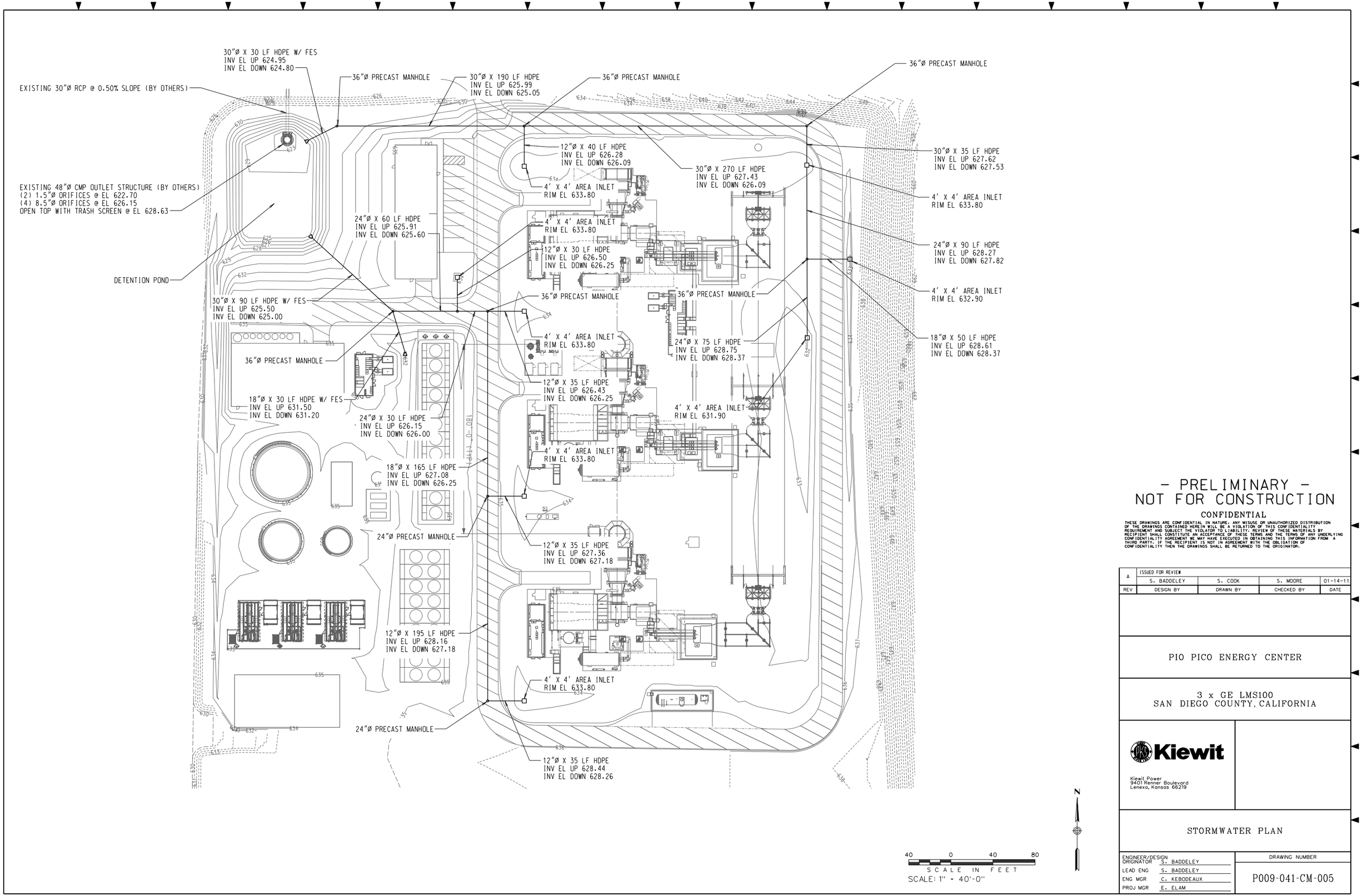
Kiewit Power
9401 Renner Boulevard
Lenexa, Kansas 66219

GRADING PLAN

ENGINEER/DESIGN ORIGINATOR	S. BADDELEY
LEAD ENG	S. BADDELEY
ENG MGR	C. KEBODEAUX
PROJ MGR	E. ELAM

DRAWING NUMBER

P009-041-CG-001



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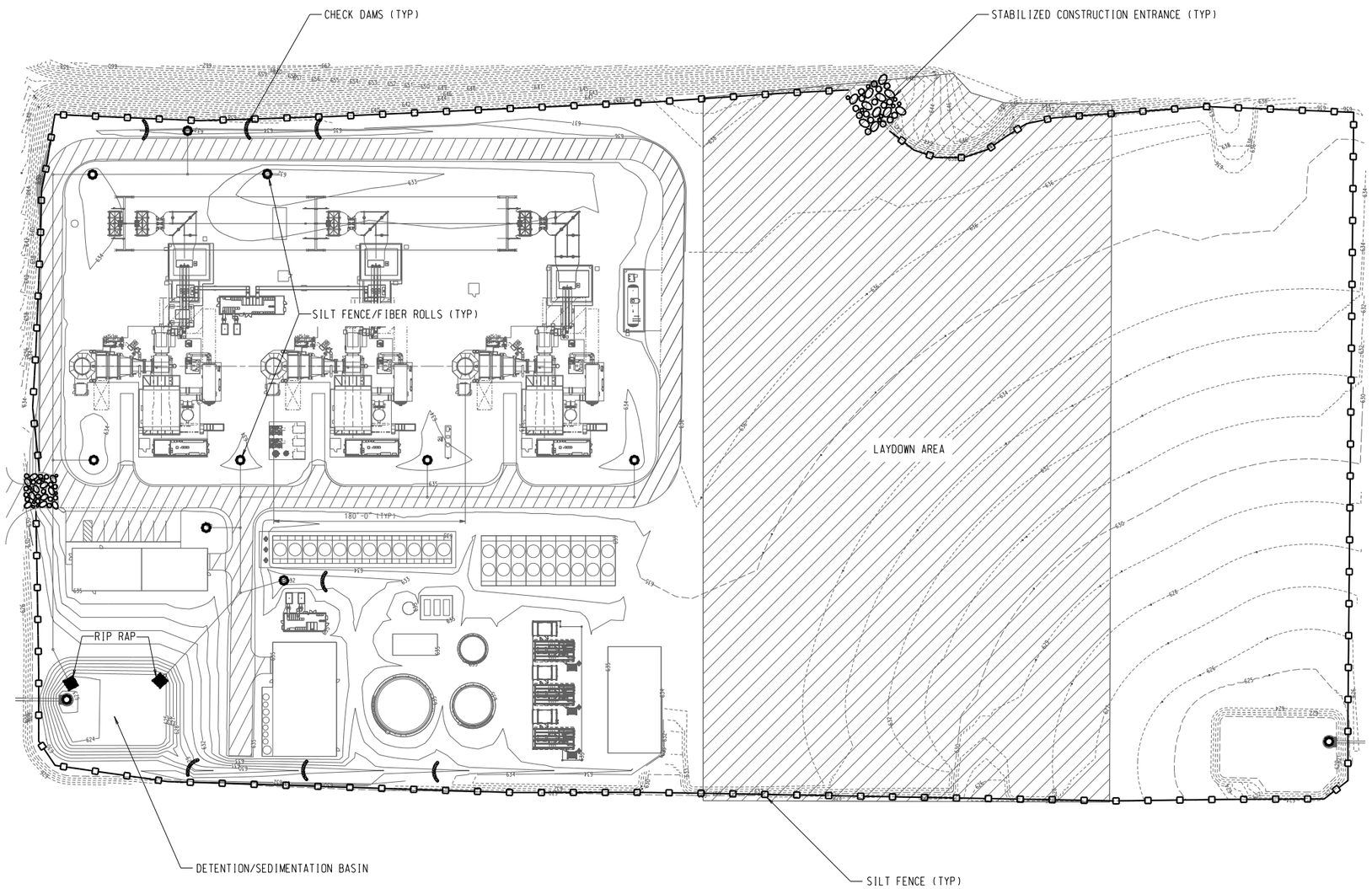
STORMWATER PLAN

ENGINEER/DESIGN ORIGINATOR	S. BADDELEY
LEAD ENG	S. BADDELEY
ENG MGR	C. KEBODEAUX
PROJ MGR	E. ELAM

DRAWING NUMBER

P009-041-CM-005



N

60 0 60 120

SCALE IN FEET

SCALE: 1" = 60'-0"

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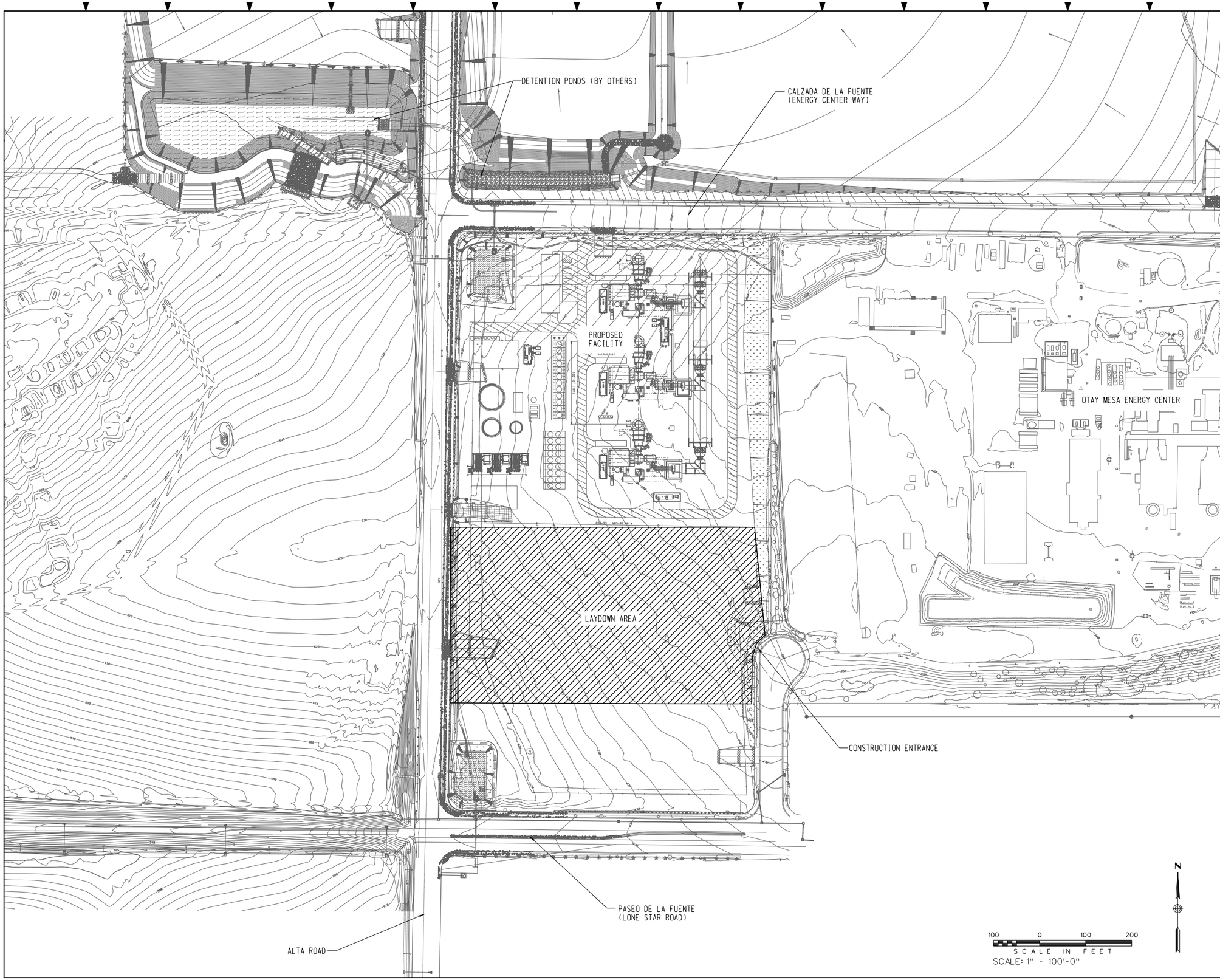
BEST MANAGEMENT PRACTICES PLAN

ENGINEER/DESIGN ORIGINATOR	S. BADDELEY
LEAD ENG	S. BADDELEY
ENG MGR	C. KEBODEAUX
PROJ MGR	E. ELAM

DRAWING NUMBER

P009-041-CM-006



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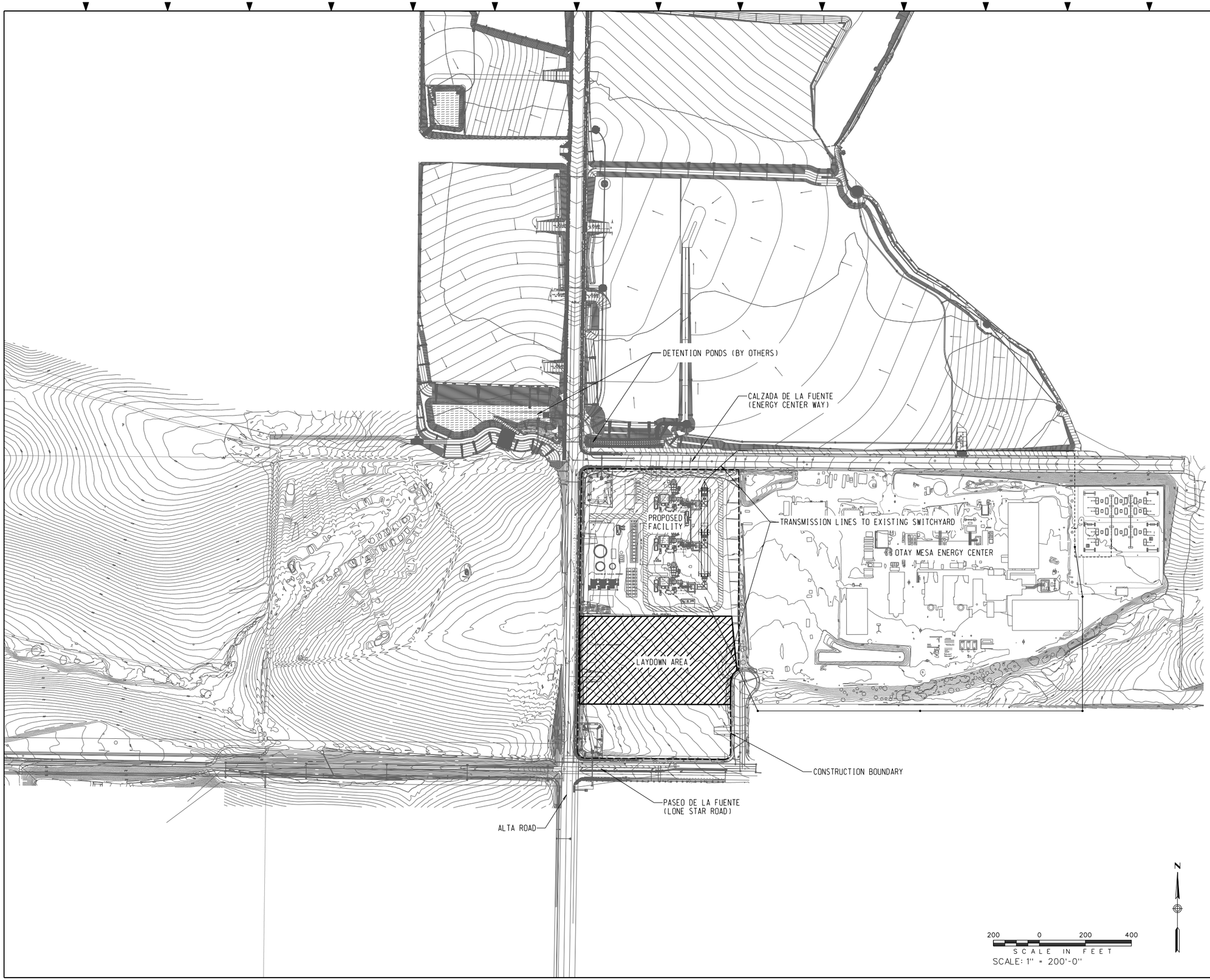
VICINITY MAP

ENGINEER/DESIGN ORIGINATOR	S. BADDELEY
LEAD ENG	S. BADDELEY
ENG MGR	C. KEBODEAUX
PROJ MGR	E. ELAM

DRAWING NUMBER

P009-041-CM-200



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SITE DELINEATION MAP

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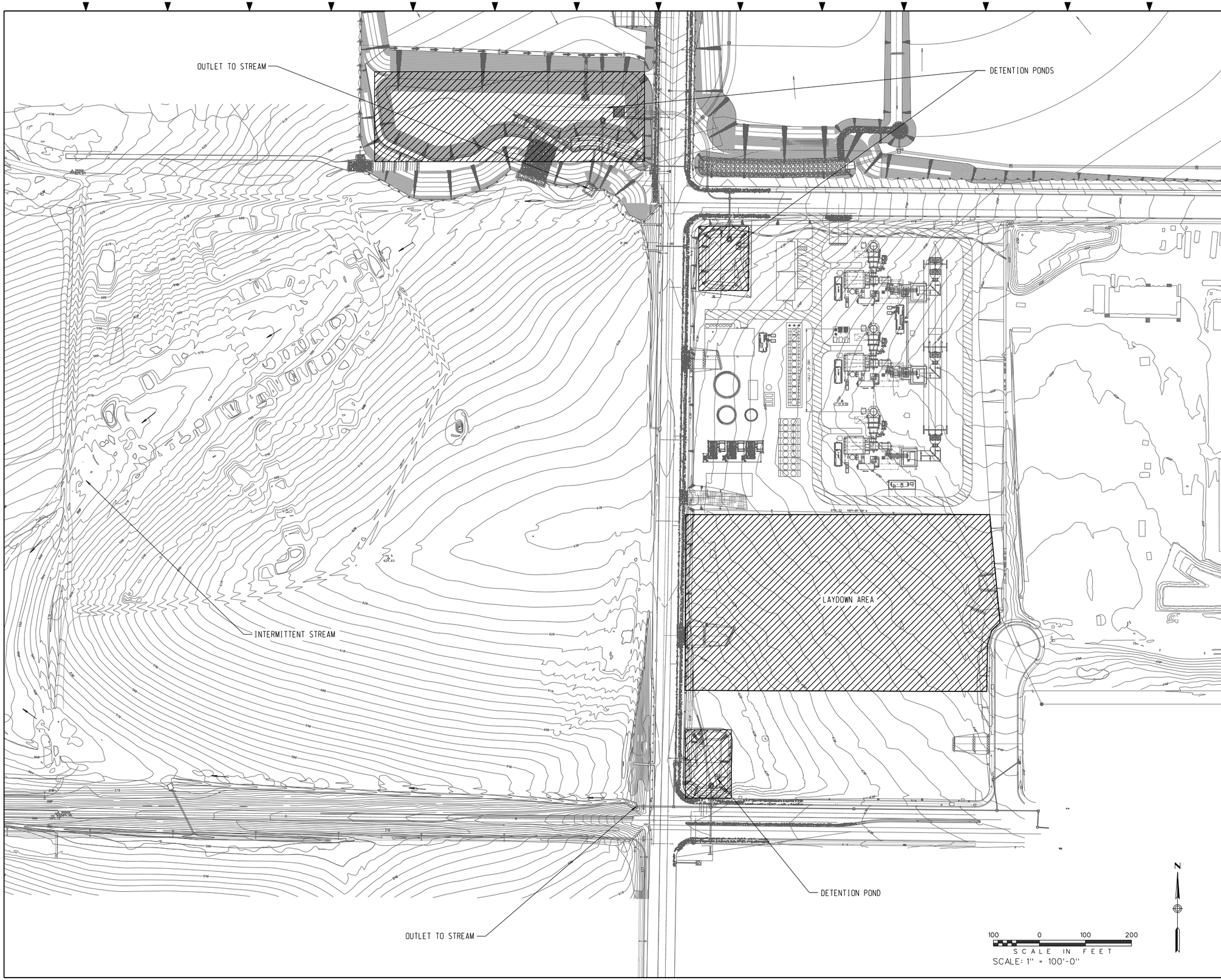
LEAD ENG	S. BADDELEY
ENG MGR	C. KEBODEAUX
PROJ MGR	E. ELAM

DRAWING NUMBER

P009-041-CM-201



NOTES:

1. DETENTION PONDS ARE PROPOSED AND SHALL BE CONSTRUCTED BY LAND DEVELOPER PRIOR TO CONSTRUCTION OF FACILITY.
2. DETENTION PONDS OUTLET TO INTERMITTENT STREAMS WHICH FLOW INTO THE JOHNSON CANYON AND ULTIMATELY ONTO THE OTAY RIVER.

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WATERCOURSES AND CRITICAL AREAS MAP

ENGINEER/DESIGN ORIGINATOR	S. BADDELEY
LEAD ENG	S. BADDELEY
ENG MGR	C. KEBODEAUX
PROJ MGR	E. ELAM

DRAWING NUMBER

P009-041-CM-202

Appendix B:

Drainage Calculations and Maps

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.23

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	Rational	-------	-------	4.069	-------	6.250	7.913	9.790	11.40	12.83	Area 1
2	Rational	-------	-------	2.489	-------	3.824	4.841	5.989	6.974	7.849	Area 2
3	Rational	-------	-------	1.053	-------	1.618	2.049	2.535	2.951	3.321	Area 3
4	Rational	-------	-------	0.506	-------	0.777	0.984	1.217	1.417	1.595	Area 4
5	Rational	-------	-------	0.992	-------	1.523	1.928	2.386	2.778	3.127	Area 5
6	Rational	-------	-------	1.019	-------	1.565	1.981	2.452	2.854	3.213	Area 6
7	Rational	-------	-------	1.019	-------	1.565	1.981	2.452	2.854	3.213	Area 7
8	Rational	-------	-------	0.496	-------	0.762	0.964	1.193	1.389	1.563	Area 8
9	Rational	-------	-------	2.591	-------	3.980	5.038	6.233	7.258	8.169	Area 9
10	Rational	-------	-------	1.705	-------	2.619	3.315	4.101	4.776	5.375	Area 10
11	Rational	-------	-------	2.004	-------	3.078	3.896	4.821	5.613	6.317	Area 11
12	Rational	-------	-------	0.251	-------	0.386	0.488	0.604	0.704	0.792	Area 12
14	Combine	1, 2,	-------	5.314	-------	8.162	10.33	12.78	14.89	16.75	(1-2)
15	Reach	14	-------	5.066	-------	8.060	10.28	12.76	14.87	16.74	(1-2)>3
16	Combine	3, 15	-------	5.417	-------	8.723	11.30	14.16	16.64	18.93	(1-3)
17	Reach	16	-------	4.552	-------	8.072	10.75	13.62	16.13	18.31	(1-3)>7
18	Combine	4, 17	-------	4.552	-------	8.201	10.91	14.03	16.68	19.10	(1-4)
19	Reach	18	-------	4.096	-------	7.755	10.66	13.80	16.52	18.88	(1-4)>Pond
21	Reach	5	-------	0.751	-------	1.264	1.691	2.184	2.608	2.986	5>6
22	Combine	6, 21	-------	1.587	-------	2.580	3.356	4.240	5.000	5.678	(5-6)
23	Reach	22	-------	1.305	-------	2.314	3.160	4.112	4.916	5.622	(5-6)>7
24	Combine	7, 8, 23	-------	2.376	-------	4.025	5.364	6.905	8.235	9.419	(5-8)
25	Reach	24	-------	2.278	-------	4.007	5.367	6.912	8.329	9.593	(5-8)>9
26	Combine	9, 25	-------	4.294	-------	6.865	8.895	11.16	13.08	14.81	(5-9)
27	Reach	26	-------	4.266	-------	6.839	8.899	11.17	13.08	14.91	(5-9)>Pond
29	Reach	10	-------	1.774	-------	2.737	3.473	4.305	5.020	5.655	10>Pond
31	Combine	11, 19, 27, 29,	-------	8.398	-------	15.56	21.36	28.22	34.13	39.37	Total Pond Inflows
33	Combine	1, 2, 3, 4, 5, 6,	-------	8.772	-------	13.47	17.06	21.11	24.57	27.66	1-6
34	Combine	7, 8, 9, 10, 11,	-------	6.519	-------	10.01	12.68	15.68	18.26	20.55	7-11
35	Combine	33, 34	-------	15.29	-------	23.49	29.73	36.79	42.83	48.21	ALL
37	Rational	-------	-------	15.92	-------	24.45	30.95	38.29	44.58	50.18	Predevelopment

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.23

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
39	Reservoir	37	-------	0.215	-------	4.134	6.544	8.468	9.833	10.84	Pond - Predevelopment
40	Reservoir	31	-------	0.194	-------	0.215	1.397	4.087	5.732	6.804	Pond - Postdevelopment

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.23

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	7.913	1	9	4,273	----	------	------	Area 1
2	Rational	4.841	1	6	1,743	----	------	------	Area 2
3	Rational	2.049	1	6	737	----	------	------	Area 3
4	Rational	0.984	1	6	354	----	------	------	Area 4
5	Rational	1.928	1	6	694	----	------	------	Area 5
6	Rational	1.981	1	6	713	----	------	------	Area 6
7	Rational	1.981	1	6	713	----	------	------	Area 7
8	Rational	0.964	1	6	347	----	------	------	Area 8
9	Rational	5.038	1	12	3,628	----	------	------	Area 9
10	Rational	3.315	1	6	1,193	----	------	------	Area 10
11	Rational	3.896	1	6	1,403	----	------	------	Area 11
12	Rational	0.488	1	6	176	----	------	------	Area 12
14	Combine	10.33	1	9	6,016	1, 2,	------	------	(1-2)
15	Reach	10.28	1	10	6,162	14	------	------	(1-2)>3
16	Combine	11.30	1	8	6,900	3, 15	------	------	(1-3)
17	Reach	10.75	1	11	7,171	16	------	------	(1-3)>7
18	Combine	10.91	1	11	7,525	4, 17	------	------	(1-4)
19	Reach	10.66	1	12	7,763	18	------	------	(1-4)>Pond
21	Reach	1.691	1	7	727	5	------	------	5>6
22	Combine	3.356	1	6	1,440	6, 21	------	------	(5-6)
23	Reach	3.160	1	8	1,507	22	------	------	(5-6)>7
24	Combine	5.364	1	7	2,568	7, 8, 23	------	------	(5-8)
25	Reach	5.367	1	8	2,634	24	------	------	(5-8)>9
26	Combine	8.895	1	9	6,262	9, 25	------	------	(5-9)
27	Reach	8.899	1	10	6,354	26	------	------	(5-9)>Pond
29	Reach	3.473	1	7	1,224	10	------	------	10>Pond
31	Combine	21.36	1	9	16,743	11, 19, 27, 29,	------	------	Total Pond Inflows
33	Combine	17.06	1	6	8,515	1, 2, 3, 4, 5, 6,	------	------	1-6
34	Combine	12.68	1	6	7,284	7, 8, 9, 10, 11,	------	------	7-11
35	Combine	29.73	1	6	15,799	33, 34	------	------	ALL
37	Rational	30.95	1	14	25,997	----	------	------	Predevelopment

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.23

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
39	Reservoir	6.544	1	25	25,995	37	627.19	22,378	Pond - Predevelopment
40	Reservoir	1.397	1	23	16,741	31	626.45	16,049	Pond - Postdevelopment

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.23

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	12.83	1	9	6,928	----	------	------	Area 1
2	Rational	7.849	1	6	2,825	----	------	------	Area 2
3	Rational	3.321	1	6	1,196	----	------	------	Area 3
4	Rational	1.595	1	6	574	----	------	------	Area 4
5	Rational	3.127	1	6	1,126	----	------	------	Area 5
6	Rational	3.213	1	6	1,157	----	------	------	Area 6
7	Rational	3.213	1	6	1,157	----	------	------	Area 7
8	Rational	1.563	1	6	563	----	------	------	Area 8
9	Rational	8.169	1	12	5,881	----	------	------	Area 9
10	Rational	5.375	1	6	1,935	----	------	------	Area 10
11	Rational	6.317	1	6	2,274	----	------	------	Area 11
12	Rational	0.792	1	6	285	----	------	------	Area 12
14	Combine	16.75	1	9	9,753	1, 2,	------	------	(1-2)
15	Reach	16.74	1	10	9,931	14	------	------	(1-2)>3
16	Combine	18.93	1	7	11,126	3, 15	------	------	(1-3)
17	Reach	18.31	1	9	11,429	16	------	------	(1-3)>7
18	Combine	19.10	1	9	12,003	4, 17	------	------	(1-4)
19	Reach	18.88	1	10	12,270	18	------	------	(1-4)>Pond
21	Reach	2.986	1	7	1,165	5	------	------	5>6
22	Combine	5.678	1	6	2,321	6, 21	------	------	(5-6)
23	Reach	5.622	1	8	2,399	22	------	------	(5-6)>7
24	Combine	9.419	1	7	4,118	7, 8, 23	------	------	(5-8)
25	Reach	9.593	1	7	4,203	24	------	------	(5-8)>9
26	Combine	14.81	1	8	10,085	9, 25	------	------	(5-9)
27	Reach	14.91	1	8	10,211	26	------	------	(5-9)>Pond
29	Reach	5.655	1	7	1,983	10	------	------	10>Pond
31	Combine	39.37	1	9	26,738	11, 19, 27, 29,	------	------	Total Pond Inflows
33	Combine	27.66	1	6	13,805	1, 2, 3, 4, 5, 6,	------	------	1-6
34	Combine	20.55	1	6	11,810	7, 8, 9, 10, 11,	------	------	7-11
35	Combine	48.21	1	6	25,615	33, 34	------	------	ALL
37	Rational	50.18	1	14	42,149	----	------	------	Predevelopment

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.23

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
39	Reservoir	10.84	1	25	42,147	37	628.44	34,471	Pond - Predevelopment
40	Reservoir	6.804	1	20	26,736	31	627.25	22,917	Pond - Postdevelopment

Hydraflow Rainfall Report

Hydraflow Hydrographs by Intelisolve v9.23 Friday, Jan 14, 2011

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	26.7259	10.7000	0.8283	--------
3	0.0000	0.0000	0.0000	--------
5	41.0506	10.7000	0.8283	--------
10	51.9702	10.7000	0.8283	--------
25	64.2988	10.7000	0.8283	--------
50	74.8661	10.7000	0.8283	--------
100	84.2594	10.7000	0.8283	--------

File name: Pio Pico.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.73	2.17	1.82	1.57	1.38	1.24	1.13	1.03	0.96	0.89	0.83	0.79
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	4.19	3.34	2.79	2.41	2.12	1.91	1.73	1.59	1.47	1.37	1.28	1.21
10	5.31	4.22	3.53	3.05	2.69	2.41	2.19	2.01	1.86	1.73	1.62	1.53
25	6.57	5.23	4.37	3.77	3.33	2.98	2.71	2.49	2.30	2.14	2.01	1.89
50	7.65	6.08	5.09	4.39	3.87	3.48	3.16	2.90	2.68	2.50	2.34	2.20
100	8.61	6.85	5.72	4.94	4.36	3.91	3.55	3.26	3.02	2.81	2.63	2.48

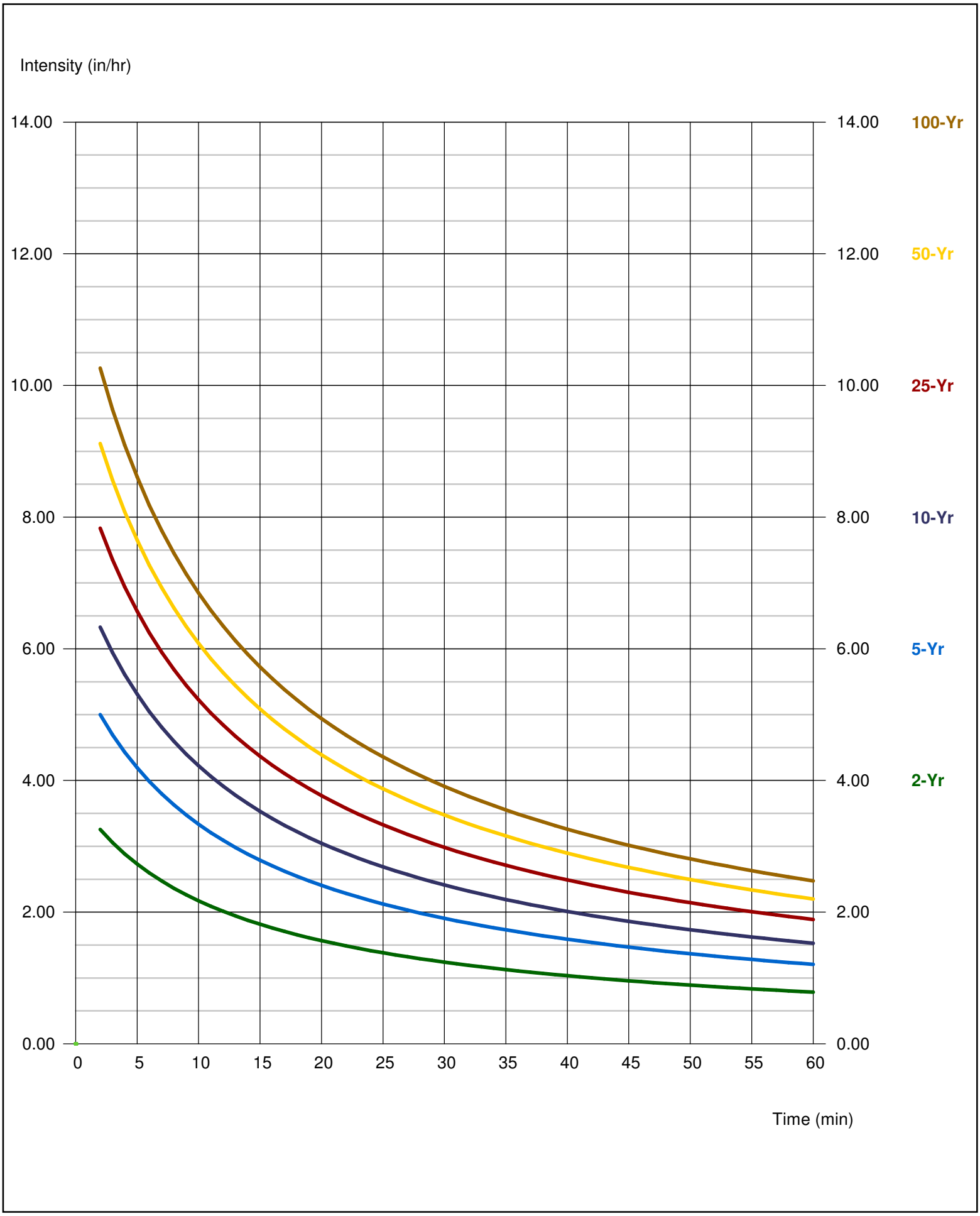
Tc = time in minutes. Values may exceed 60.

Precip. file name: Pio Pico.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.80	0.00	2.50	3.00	3.60	4.00	4.50
SCS 6-Hr	0.00	1.20	0.00	1.50	1.70	2.00	2.25	2.50
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hydraflow IDF Curves

IDF file: Pio Pico.IDF



Hydrograph Report

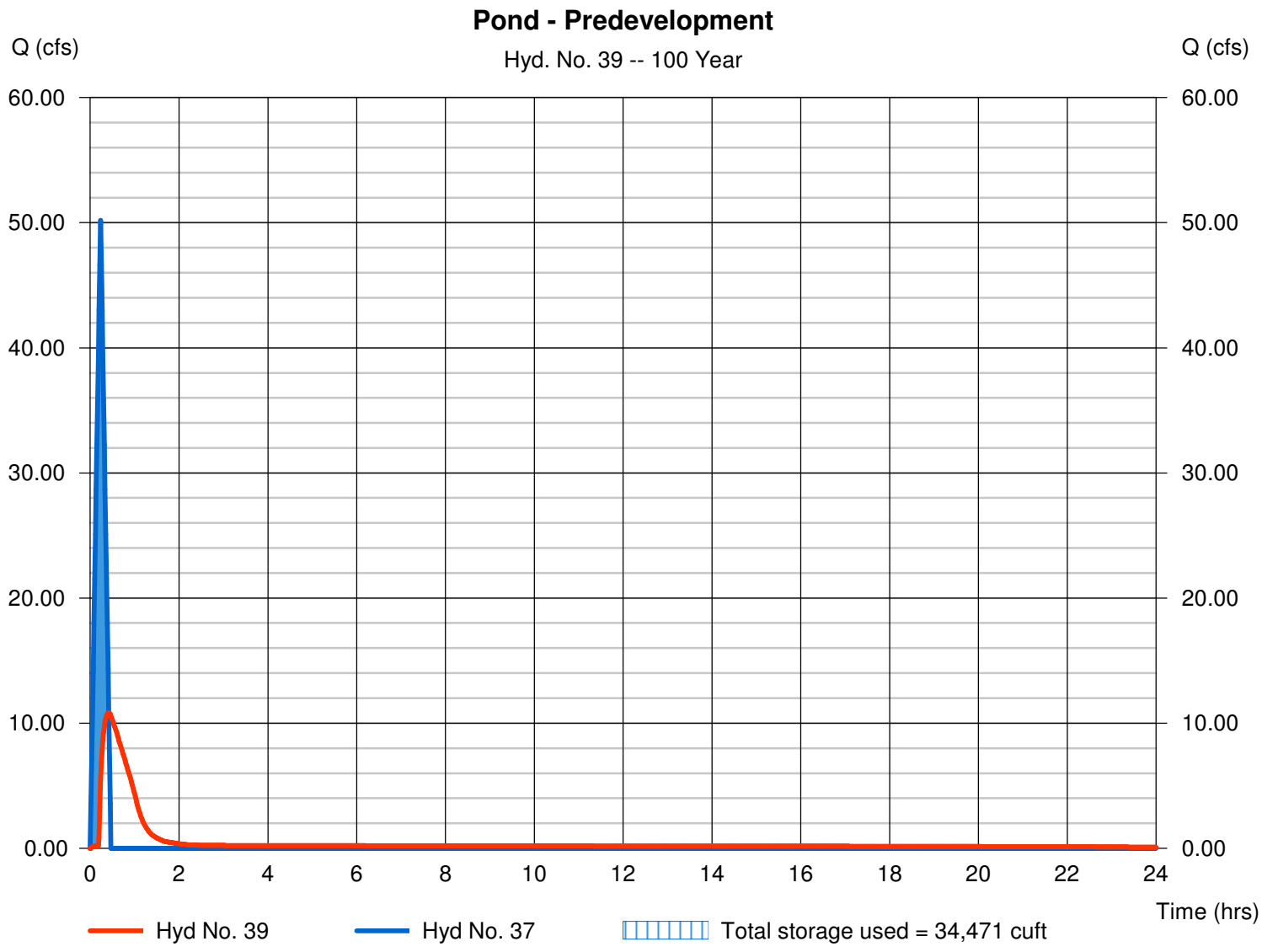
Hydraflow Hydrographs by Intelisolve v9.23 Friday, Jan 14, 2011

Hyd. No. 39

Pond - Predevelopment

Hydrograph type	=	Reservoir	Peak discharge	=	10.84 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.42 hrs
Time interval	=	1 min	Hyd. volume	=	42,147 cuft
Inflow hyd. No.	=	37 - Predevelopment	Max. Elevation	=	628.44 ft
Reservoir name	=	Proposed Pond	Max. Storage	=	34,471 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.23 — Friday, Jan 14, 2011

Pond No. 3 - Proposed Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 622.70 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	622.70	90	0	0
0.30	623.00	330	59	59
1.30	624.00	2,060	1,071	1,131
2.30	625.00	6,665	4,143	5,274
3.30	626.00	7,650	7,151	12,425
4.30	627.00	8,700	8,169	20,593
5.30	628.00	9,835	9,261	29,854
6.30	629.00	11,215	10,516	40,371
7.30	630.00	13,010	12,100	52,471

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	1.50	8.50	Inactive
Span (in)	= 30.00	1.50	8.50	0.00
No. Barrels	= 1	2	4	0
Invert El. (ft)	= 618.00	622.70	626.15	0.00
Length (ft)	= 90.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.56	Inactive	Inactive	Inactive
Crest El. (ft)	= 628.63	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	622.70	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.03	6	622.73	42.06 oc	0.00 ic	0.00	---	0.00	---	---	---	---	---	0.003
0.06	12	622.76	42.06 oc	0.01 ic	0.00	---	0.00	---	---	---	---	---	0.010
0.09	18	622.79	42.06 oc	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.020
0.12	24	622.82	42.06 oc	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.029
0.15	30	622.85	42.06 oc	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.035
0.18	36	622.88	42.06 oc	0.04 ic	0.00	---	0.00	---	---	---	---	---	0.041
0.21	41	622.91	42.06 oc	0.05 ic	0.00	---	0.00	---	---	---	---	---	0.045
0.24	47	622.94	42.06 oc	0.05 ic	0.00	---	0.00	---	---	---	---	---	0.050
0.27	53	622.97	42.06 oc	0.05 ic	0.00	---	0.00	---	---	---	---	---	0.054
0.30	59	623.00	42.06 oc	0.06 ic	0.00	---	0.00	---	---	---	---	---	0.058
0.40	166	623.10	42.06 oc	0.07 ic	0.00	---	0.00	---	---	---	---	---	0.069
0.50	274	623.20	42.06 oc	0.08 ic	0.00	---	0.00	---	---	---	---	---	0.078
0.60	381	623.30	42.06 oc	0.09 ic	0.00	---	0.00	---	---	---	---	---	0.087
0.70	488	623.40	42.06 oc	0.09 ic	0.00	---	0.00	---	---	---	---	---	0.094
0.80	595	623.50	42.06 oc	0.10 ic	0.00	---	0.00	---	---	---	---	---	0.101
0.90	702	623.60	42.06 oc	0.11 ic	0.00	---	0.00	---	---	---	---	---	0.108
1.00	809	623.70	42.06 oc	0.11 ic	0.00	---	0.00	---	---	---	---	---	0.114
1.10	916	623.80	42.06 oc	0.12 ic	0.00	---	0.00	---	---	---	---	---	0.120
1.20	1,023	623.90	42.06 oc	0.13 ic	0.00	---	0.00	---	---	---	---	---	0.126
1.30	1,131	624.00	42.06 oc	0.13 ic	0.00	---	0.00	---	---	---	---	---	0.131
1.40	1,545	624.10	42.06 oc	0.14 ic	0.00	---	0.00	---	---	---	---	---	0.137
1.50	1,959	624.20	42.06 oc	0.14 ic	0.00	---	0.00	---	---	---	---	---	0.142
1.60	2,374	624.30	42.06 oc	0.15 ic	0.00	---	0.00	---	---	---	---	---	0.147
1.70	2,788	624.40	42.06 oc	0.15 ic	0.00	---	0.00	---	---	---	---	---	0.151
1.80	3,202	624.50	42.06 oc	0.16 ic	0.00	---	0.00	---	---	---	---	---	0.156
1.90	3,616	624.60	42.06 oc	0.16 ic	0.00	---	0.00	---	---	---	---	---	0.160
2.00	4,031	624.70	42.06 oc	0.16 ic	0.00	---	0.00	---	---	---	---	---	0.164
2.10	4,445	624.80	42.06 oc	0.17 ic	0.00	---	0.00	---	---	---	---	---	0.169
2.20	4,859	624.90	42.06 oc	0.17 ic	0.00	---	0.00	---	---	---	---	---	0.173
2.30	5,274	625.00	42.06 oc	0.18 ic	0.00	---	0.00	---	---	---	---	---	0.177
2.40	5,989	625.10	42.06 oc	0.18 ic	0.00	---	0.00	---	---	---	---	---	0.181
2.50	6,704	625.20	42.06 oc	0.18 ic	0.00	---	0.00	---	---	---	---	---	0.184
2.60	7,419	625.30	42.06 oc	0.19 ic	0.00	---	0.00	---	---	---	---	---	0.188
2.70	8,134	625.40	42.06 oc	0.19 ic	0.00	---	0.00	---	---	---	---	---	0.192

Continues on next page...

Proposed Pond

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
2.80	8,849	625.50	42.06 oc	0.20 ic	0.00	---	0.00	---	---	---	---	---	0.195
2.90	9,564	625.60	42.06 oc	0.20 ic	0.00	---	0.00	---	---	---	---	---	0.199
3.00	10,279	625.70	42.06 oc	0.20 ic	0.00	---	0.00	---	---	---	---	---	0.203
3.10	10,995	625.80	42.06 oc	0.21 ic	0.00	---	0.00	---	---	---	---	---	0.206
3.20	11,710	625.90	42.06 oc	0.21 ic	0.00	---	0.00	---	---	---	---	---	0.209
3.30	12,425	626.00	42.06 oc	0.21 ic	0.00	---	0.00	---	---	---	---	---	0.213
3.40	13,242	626.10	42.06 oc	0.22 ic	0.00	---	0.00	---	---	---	---	---	0.216
3.50	14,059	626.20	42.06 oc	0.22 ic	0.04 ic	---	0.00	---	---	---	---	---	0.259
3.60	14,875	626.30	42.06 oc	0.22 ic	0.32 ic	---	0.00	---	---	---	---	---	0.545
3.70	15,692	626.40	42.06 oc	0.23 ic	0.85 ic	---	0.00	---	---	---	---	---	1.072
3.80	16,509	626.50	42.06 oc	0.23 ic	1.59 ic	---	0.00	---	---	---	---	---	1.816
3.90	17,326	626.60	42.06 oc	0.23 ic	2.43 ic	---	0.00	---	---	---	---	---	2.662
4.00	18,143	626.70	42.06 oc	0.23 ic	3.33 ic	---	0.00	---	---	---	---	---	3.569
4.10	18,960	626.80	42.06 oc	0.24 ic	4.16 ic	---	0.00	---	---	---	---	---	4.395
4.20	19,777	626.90	42.06 oc	0.24 ic	4.77 ic	---	0.00	---	---	---	---	---	5.013
4.30	20,593	627.00	42.06 oc	0.24 ic	5.34 ic	---	0.00	---	---	---	---	---	5.587
4.40	21,519	627.10	42.06 oc	0.25 ic	5.86 ic	---	0.00	---	---	---	---	---	6.104
4.50	22,446	627.20	42.06 oc	0.25 ic	6.33 ic	---	0.00	---	---	---	---	---	6.579
4.60	23,372	627.30	42.06 oc	0.25 ic	6.77 ic	---	0.00	---	---	---	---	---	7.021
4.70	24,298	627.40	42.06 oc	0.25 ic	7.18 ic	---	0.00	---	---	---	---	---	7.437
4.80	25,224	627.50	42.06 oc	0.26 ic	7.57 ic	---	0.00	---	---	---	---	---	7.829
4.90	26,150	627.60	42.06 oc	0.26 ic	7.94 ic	---	0.00	---	---	---	---	---	8.203
5.00	27,076	627.70	42.06 oc	0.26 ic	8.30 ic	---	0.00	---	---	---	---	---	8.560
5.10	28,002	627.80	42.06 oc	0.27 ic	8.64 ic	---	0.00	---	---	---	---	---	8.903
5.20	28,928	627.90	42.06 oc	0.27 ic	8.96 ic	---	0.00	---	---	---	---	---	9.233
5.30	29,854	628.00	42.06 oc	0.27 ic	9.28 ic	---	0.00	---	---	---	---	---	9.552
5.40	30,906	628.10	42.06 oc	0.27 ic	9.59 ic	---	0.00	---	---	---	---	---	9.859
5.50	31,957	628.20	42.06 oc	0.28 ic	9.88 ic	---	0.00	---	---	---	---	---	10.16
5.60	33,009	628.30	42.06 oc	0.28 ic	10.17 ic	---	0.00	---	---	---	---	---	10.45
5.70	34,061	628.40	42.06 oc	0.28 ic	10.45 ic	---	0.00	---	---	---	---	---	10.73
5.80	35,112	628.50	42.06 oc	0.28 ic	10.72 ic	---	0.00	---	---	---	---	---	11.00
5.90	36,164	628.60	42.06 oc	0.29 ic	10.99 ic	---	0.00	---	---	---	---	---	11.27
6.00	37,216	628.70	42.06 oc	0.29 ic	11.24 ic	---	0.77	---	---	---	---	---	12.30
6.10	38,267	628.80	42.06 oc	0.29 ic	11.50 ic	---	2.93	---	---	---	---	---	14.71
6.20	39,319	628.90	42.06 oc	0.29 ic	11.75 ic	---	5.86	---	---	---	---	---	17.90
6.30	40,371	629.00	42.06 oc	0.30 ic	11.99 ic	---	9.41	---	---	---	---	---	21.70
6.40	41,581	629.10	42.06 oc	0.30 ic	12.23 ic	---	13.48	---	---	---	---	---	26.00
6.50	42,791	629.20	42.06 oc	0.30 ic	12.46 ic	---	18.00	---	---	---	---	---	30.76
6.60	44,001	629.30	42.06 oc	0.30 ic	12.69 ic	---	22.93	---	---	---	---	---	35.92
6.70	45,211	629.40	42.06 oc	0.30 ic	12.91 ic	---	28.25	---	---	---	---	---	41.47
6.80	46,421	629.50	47.36 oc	0.29 ic	13.13 ic	---	33.93	---	---	---	---	---	47.36
6.90	47,631	629.60	53.57 ic	0.27 ic	13.35 ic	---	39.95	---	---	---	---	---	53.57
7.00	48,841	629.70	60.08 ic	0.24 ic	13.57 ic	---	46.28	---	---	---	---	---	60.08
7.10	50,051	629.80	65.81 ic	0.20 ic	12.69 ic	---	52.92	---	---	---	---	---	65.80
7.20	51,261	629.90	70.23 ic	0.16 ic	10.23 ic	---	59.84	---	---	---	---	---	70.23
7.30	52,471	630.00	73.30 ic	0.13 ic	8.06 ic	---	65.11 s	---	---	---	---	---	73.30

...End

Hydrograph Report

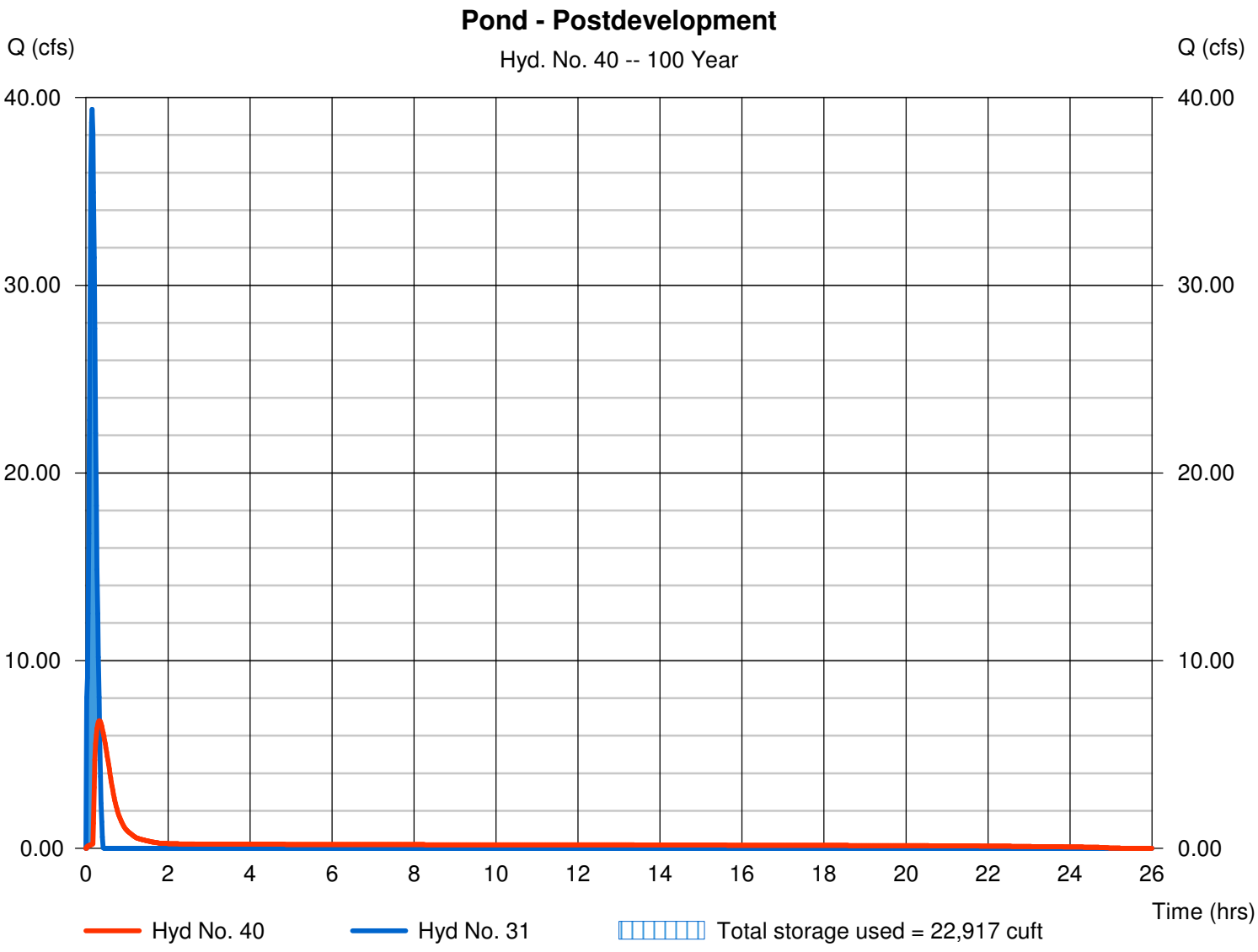
Hydraflow Hydrographs by Intelisolve v9.23 Friday, Jan 14, 2011

Hyd. No. 40

Pond - Postdevelopment

Hydrograph type	=	Reservoir	Peak discharge	=	6.804 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.33 hrs
Time interval	=	1 min	Hyd. volume	=	26,736 cuft
Inflow hyd. No.	=	31 - Total Pond Inflows	Max. Elevation	=	627.25 ft
Reservoir name	=	Proposed Pond	Max. Storage	=	22,917 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.23 — Friday, Jan 14, 2011

Pond No. 3 - Proposed Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 622.70 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	622.70	90	0	0
0.30	623.00	330	59	59
1.30	624.00	2,060	1,071	1,131
2.30	625.00	6,665	4,143	5,274
3.30	626.00	7,650	7,151	12,425
4.30	627.00	8,700	8,169	20,593
5.30	628.00	9,835	9,261	29,854
6.30	629.00	11,215	10,516	40,371
7.30	630.00	13,010	12,100	52,471

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	1.50	8.50	Inactive
Span (in)	= 30.00	1.50	8.50	0.00
No. Barrels	= 1	2	4	0
Invert El. (ft)	= 618.00	622.70	626.15	0.00
Length (ft)	= 90.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.56	Inactive	Inactive	Inactive
Crest El. (ft)	= 628.63	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	622.70	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.03	6	622.73	42.06 oc	0.00 ic	0.00	---	0.00	---	---	---	---	---	0.003
0.06	12	622.76	42.06 oc	0.01 ic	0.00	---	0.00	---	---	---	---	---	0.010
0.09	18	622.79	42.06 oc	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.020
0.12	24	622.82	42.06 oc	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.029
0.15	30	622.85	42.06 oc	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.035
0.18	36	622.88	42.06 oc	0.04 ic	0.00	---	0.00	---	---	---	---	---	0.041
0.21	41	622.91	42.06 oc	0.05 ic	0.00	---	0.00	---	---	---	---	---	0.045
0.24	47	622.94	42.06 oc	0.05 ic	0.00	---	0.00	---	---	---	---	---	0.050
0.27	53	622.97	42.06 oc	0.05 ic	0.00	---	0.00	---	---	---	---	---	0.054
0.30	59	623.00	42.06 oc	0.06 ic	0.00	---	0.00	---	---	---	---	---	0.058
0.40	166	623.10	42.06 oc	0.07 ic	0.00	---	0.00	---	---	---	---	---	0.069
0.50	274	623.20	42.06 oc	0.08 ic	0.00	---	0.00	---	---	---	---	---	0.078
0.60	381	623.30	42.06 oc	0.09 ic	0.00	---	0.00	---	---	---	---	---	0.087
0.70	488	623.40	42.06 oc	0.09 ic	0.00	---	0.00	---	---	---	---	---	0.094
0.80	595	623.50	42.06 oc	0.10 ic	0.00	---	0.00	---	---	---	---	---	0.101
0.90	702	623.60	42.06 oc	0.11 ic	0.00	---	0.00	---	---	---	---	---	0.108
1.00	809	623.70	42.06 oc	0.11 ic	0.00	---	0.00	---	---	---	---	---	0.114
1.10	916	623.80	42.06 oc	0.12 ic	0.00	---	0.00	---	---	---	---	---	0.120
1.20	1,023	623.90	42.06 oc	0.13 ic	0.00	---	0.00	---	---	---	---	---	0.126
1.30	1,131	624.00	42.06 oc	0.13 ic	0.00	---	0.00	---	---	---	---	---	0.131
1.40	1,545	624.10	42.06 oc	0.14 ic	0.00	---	0.00	---	---	---	---	---	0.137
1.50	1,959	624.20	42.06 oc	0.14 ic	0.00	---	0.00	---	---	---	---	---	0.142
1.60	2,374	624.30	42.06 oc	0.15 ic	0.00	---	0.00	---	---	---	---	---	0.147
1.70	2,788	624.40	42.06 oc	0.15 ic	0.00	---	0.00	---	---	---	---	---	0.151
1.80	3,202	624.50	42.06 oc	0.16 ic	0.00	---	0.00	---	---	---	---	---	0.156
1.90	3,616	624.60	42.06 oc	0.16 ic	0.00	---	0.00	---	---	---	---	---	0.160
2.00	4,031	624.70	42.06 oc	0.16 ic	0.00	---	0.00	---	---	---	---	---	0.164
2.10	4,445	624.80	42.06 oc	0.17 ic	0.00	---	0.00	---	---	---	---	---	0.169
2.20	4,859	624.90	42.06 oc	0.17 ic	0.00	---	0.00	---	---	---	---	---	0.173
2.30	5,274	625.00	42.06 oc	0.18 ic	0.00	---	0.00	---	---	---	---	---	0.177
2.40	5,989	625.10	42.06 oc	0.18 ic	0.00	---	0.00	---	---	---	---	---	0.181
2.50	6,704	625.20	42.06 oc	0.18 ic	0.00	---	0.00	---	---	---	---	---	0.184
2.60	7,419	625.30	42.06 oc	0.19 ic	0.00	---	0.00	---	---	---	---	---	0.188
2.70	8,134	625.40	42.06 oc	0.19 ic	0.00	---	0.00	---	---	---	---	---	0.192

Continues on next page...

Proposed Pond

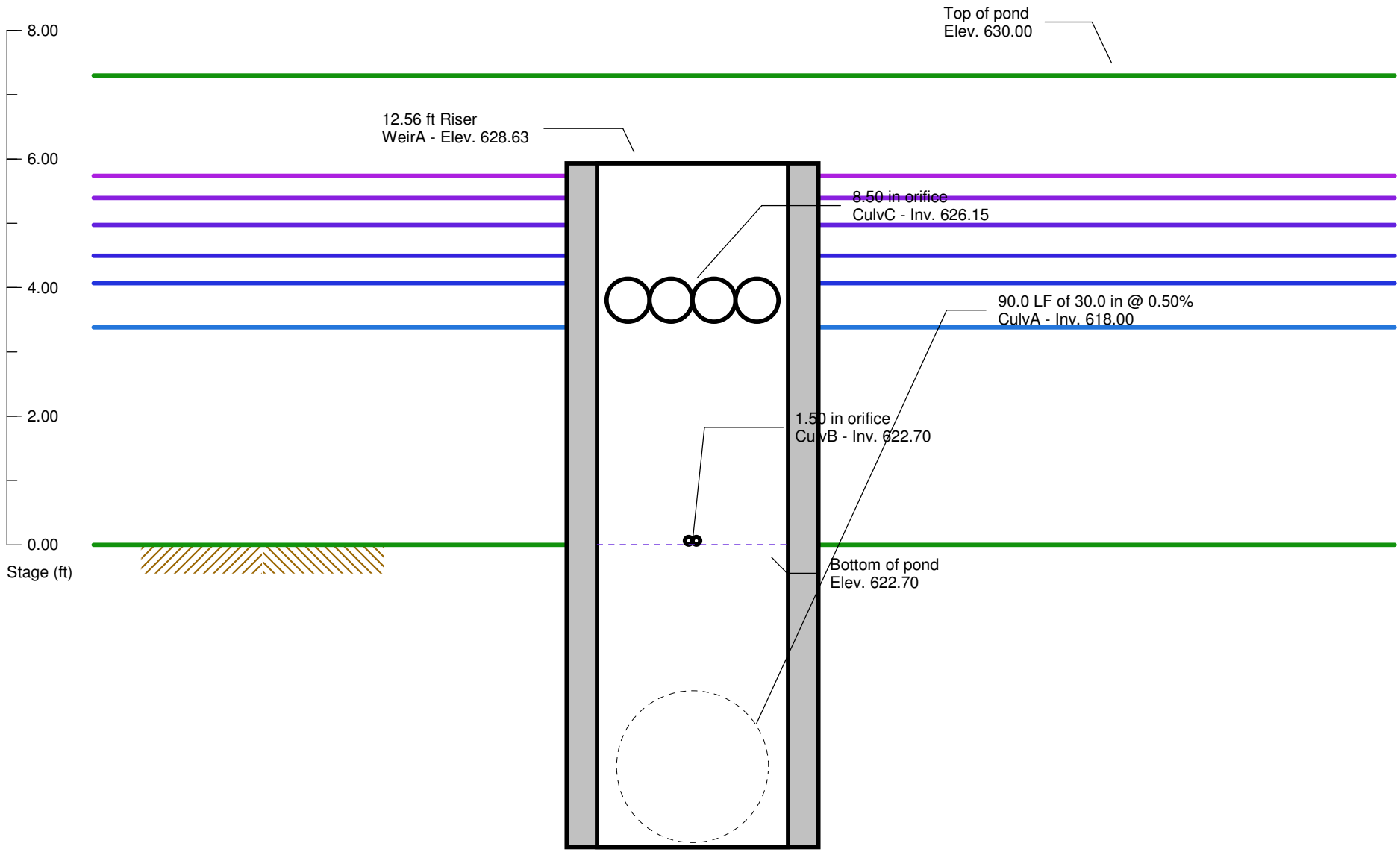
Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
2.80	8,849	625.50	42.06 oc	0.20 ic	0.00	---	0.00	---	---	---	---	---	0.195
2.90	9,564	625.60	42.06 oc	0.20 ic	0.00	---	0.00	---	---	---	---	---	0.199
3.00	10,279	625.70	42.06 oc	0.20 ic	0.00	---	0.00	---	---	---	---	---	0.203
3.10	10,995	625.80	42.06 oc	0.21 ic	0.00	---	0.00	---	---	---	---	---	0.206
3.20	11,710	625.90	42.06 oc	0.21 ic	0.00	---	0.00	---	---	---	---	---	0.209
3.30	12,425	626.00	42.06 oc	0.21 ic	0.00	---	0.00	---	---	---	---	---	0.213
3.40	13,242	626.10	42.06 oc	0.22 ic	0.00	---	0.00	---	---	---	---	---	0.216
3.50	14,059	626.20	42.06 oc	0.22 ic	0.04 ic	---	0.00	---	---	---	---	---	0.259
3.60	14,875	626.30	42.06 oc	0.22 ic	0.32 ic	---	0.00	---	---	---	---	---	0.545
3.70	15,692	626.40	42.06 oc	0.23 ic	0.85 ic	---	0.00	---	---	---	---	---	1.072
3.80	16,509	626.50	42.06 oc	0.23 ic	1.59 ic	---	0.00	---	---	---	---	---	1.816
3.90	17,326	626.60	42.06 oc	0.23 ic	2.43 ic	---	0.00	---	---	---	---	---	2.662
4.00	18,143	626.70	42.06 oc	0.23 ic	3.33 ic	---	0.00	---	---	---	---	---	3.569
4.10	18,960	626.80	42.06 oc	0.24 ic	4.16 ic	---	0.00	---	---	---	---	---	4.395
4.20	19,777	626.90	42.06 oc	0.24 ic	4.77 ic	---	0.00	---	---	---	---	---	5.013
4.30	20,593	627.00	42.06 oc	0.24 ic	5.34 ic	---	0.00	---	---	---	---	---	5.587
4.40	21,519	627.10	42.06 oc	0.25 ic	5.86 ic	---	0.00	---	---	---	---	---	6.104
4.50	22,446	627.20	42.06 oc	0.25 ic	6.33 ic	---	0.00	---	---	---	---	---	6.579
4.60	23,372	627.30	42.06 oc	0.25 ic	6.77 ic	---	0.00	---	---	---	---	---	7.021
4.70	24,298	627.40	42.06 oc	0.25 ic	7.18 ic	---	0.00	---	---	---	---	---	7.437
4.80	25,224	627.50	42.06 oc	0.26 ic	7.57 ic	---	0.00	---	---	---	---	---	7.829
4.90	26,150	627.60	42.06 oc	0.26 ic	7.94 ic	---	0.00	---	---	---	---	---	8.203
5.00	27,076	627.70	42.06 oc	0.26 ic	8.30 ic	---	0.00	---	---	---	---	---	8.560
5.10	28,002	627.80	42.06 oc	0.27 ic	8.64 ic	---	0.00	---	---	---	---	---	8.903
5.20	28,928	627.90	42.06 oc	0.27 ic	8.96 ic	---	0.00	---	---	---	---	---	9.233
5.30	29,854	628.00	42.06 oc	0.27 ic	9.28 ic	---	0.00	---	---	---	---	---	9.552
5.40	30,906	628.10	42.06 oc	0.27 ic	9.59 ic	---	0.00	---	---	---	---	---	9.859
5.50	31,957	628.20	42.06 oc	0.28 ic	9.88 ic	---	0.00	---	---	---	---	---	10.16
5.60	33,009	628.30	42.06 oc	0.28 ic	10.17 ic	---	0.00	---	---	---	---	---	10.45
5.70	34,061	628.40	42.06 oc	0.28 ic	10.45 ic	---	0.00	---	---	---	---	---	10.73
5.80	35,112	628.50	42.06 oc	0.28 ic	10.72 ic	---	0.00	---	---	---	---	---	11.00
5.90	36,164	628.60	42.06 oc	0.29 ic	10.99 ic	---	0.00	---	---	---	---	---	11.27
6.00	37,216	628.70	42.06 oc	0.29 ic	11.24 ic	---	0.77	---	---	---	---	---	12.30
6.10	38,267	628.80	42.06 oc	0.29 ic	11.50 ic	---	2.93	---	---	---	---	---	14.71
6.20	39,319	628.90	42.06 oc	0.29 ic	11.75 ic	---	5.86	---	---	---	---	---	17.90
6.30	40,371	629.00	42.06 oc	0.30 ic	11.99 ic	---	9.41	---	---	---	---	---	21.70
6.40	41,581	629.10	42.06 oc	0.30 ic	12.23 ic	---	13.48	---	---	---	---	---	26.00
6.50	42,791	629.20	42.06 oc	0.30 ic	12.46 ic	---	18.00	---	---	---	---	---	30.76
6.60	44,001	629.30	42.06 oc	0.30 ic	12.69 ic	---	22.93	---	---	---	---	---	35.92
6.70	45,211	629.40	42.06 oc	0.30 ic	12.91 ic	---	28.25	---	---	---	---	---	41.47
6.80	46,421	629.50	47.36 oc	0.29 ic	13.13 ic	---	33.93	---	---	---	---	---	47.36
6.90	47,631	629.60	53.57 ic	0.27 ic	13.35 ic	---	39.95	---	---	---	---	---	53.57
7.00	48,841	629.70	60.08 ic	0.24 ic	13.57 ic	---	46.28	---	---	---	---	---	60.08
7.10	50,051	629.80	65.81 ic	0.20 ic	12.69 ic	---	52.92	---	---	---	---	---	65.80
7.20	51,261	629.90	70.23 ic	0.16 ic	10.23 ic	---	59.84	---	---	---	---	---	70.23
7.30	52,471	630.00	73.30 ic	0.13 ic	8.06 ic	---	65.11 s	---	---	---	---	---	73.30

...End

Pond No. 3 - Proposed Pond

Hydraflow Hydrographs by Intelisolve v9.23



Front View

NTS - Looking Downstream

25-yr
10-yr
100-yr
5-yr
50-yr
2-yr

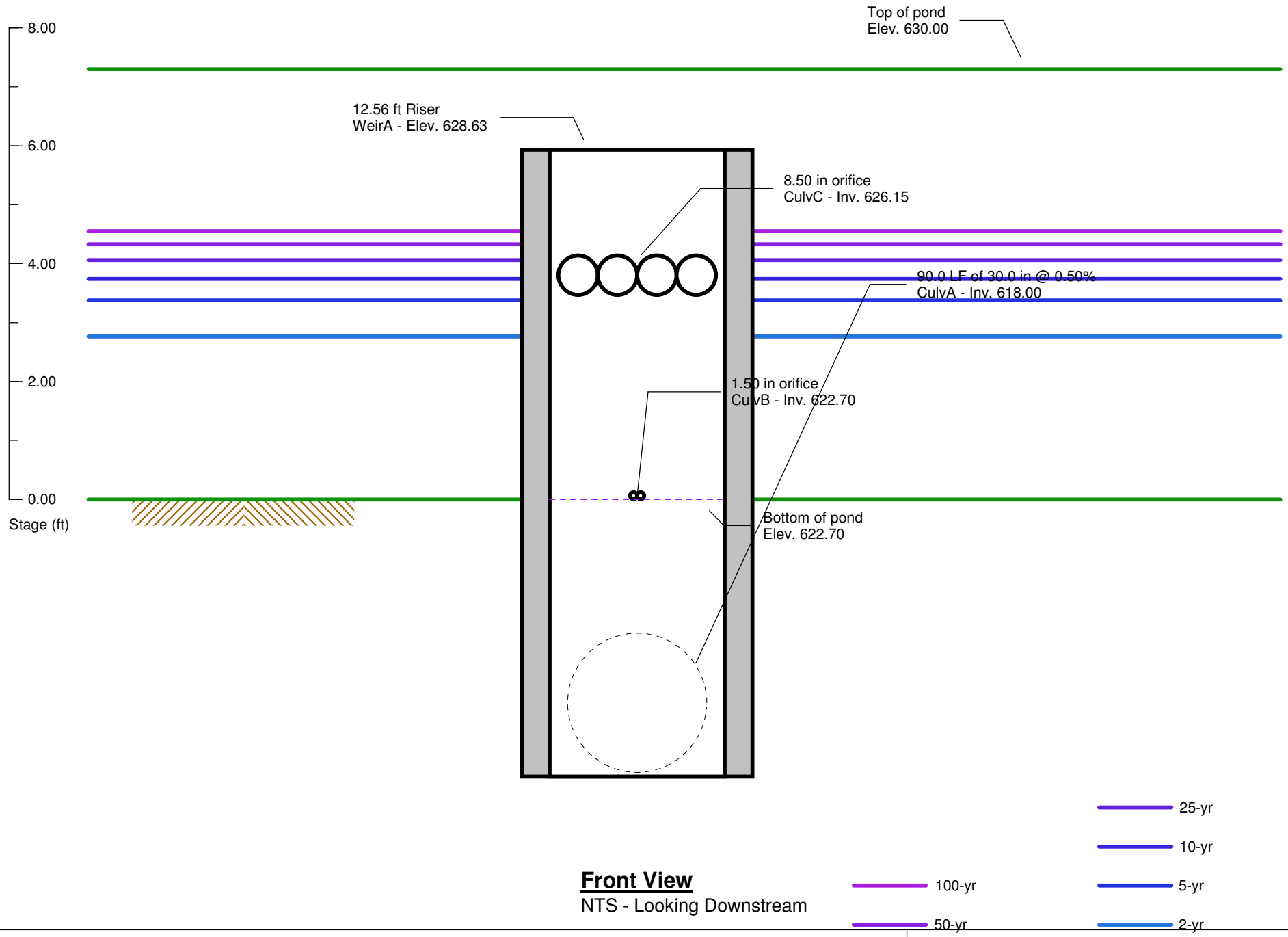
Project: Pio Pico - Otay - Post Development.gpw

Friday, Jan 14, 2011

Inflow hydrograph = 37. Rational - Predevelopment

Pond No. 3 - Proposed Pond

Hydraflow Hydrographs by Intelisolve v9.23



Front View

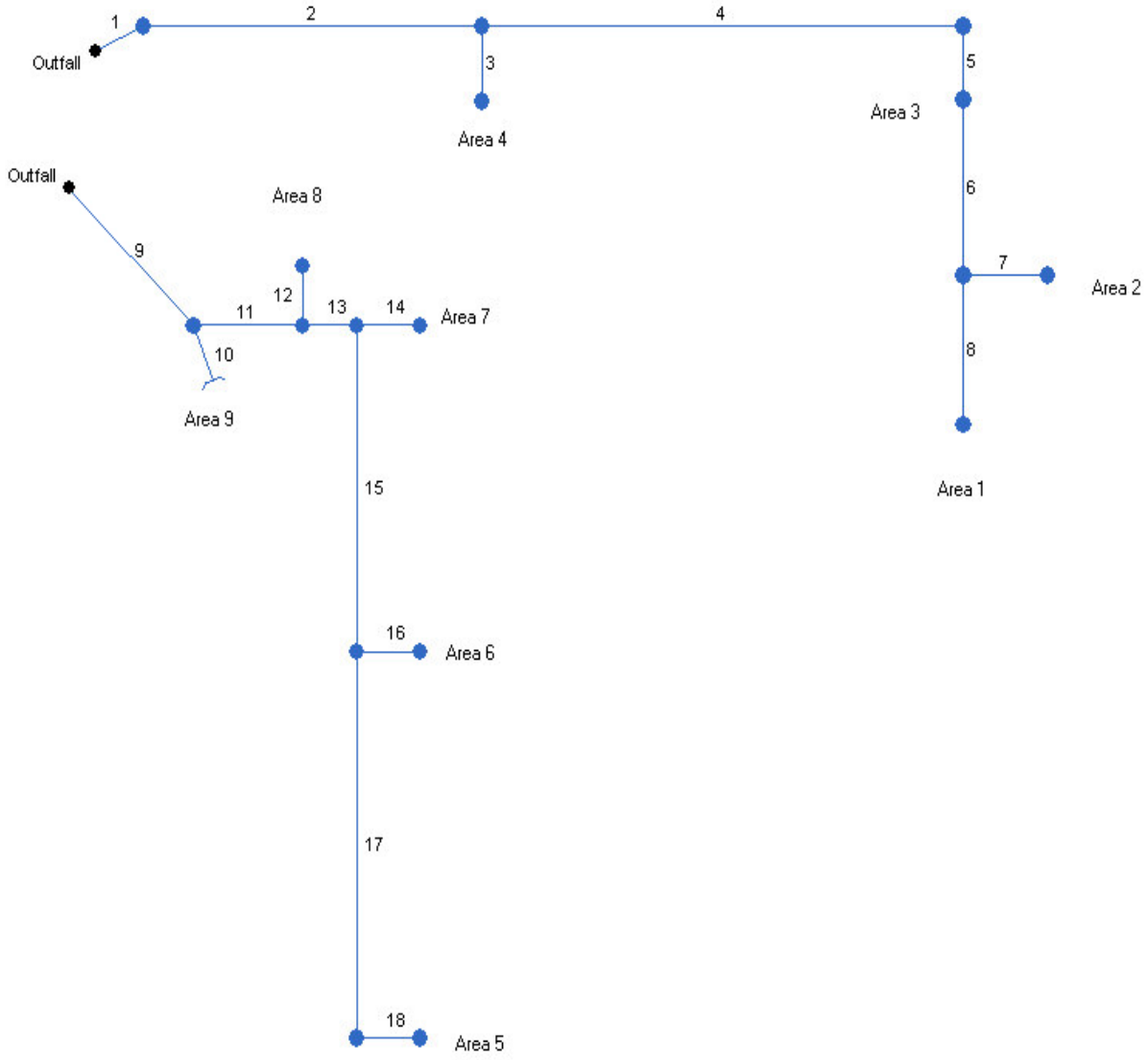
NTS - Looking Downstream

Project: Pio Pico - Otay - Post Development.gpw

Friday, Jan 14, 2011

Inflow hydrograph = 31. Combine - Total Pond Inflows

Hydraflow Plan View



Project File: Pio Pico - Otay - Storm Sewer - 100 Year.stm	No. Lines: 18	01-14-2011

Storm Sewer Summary Report

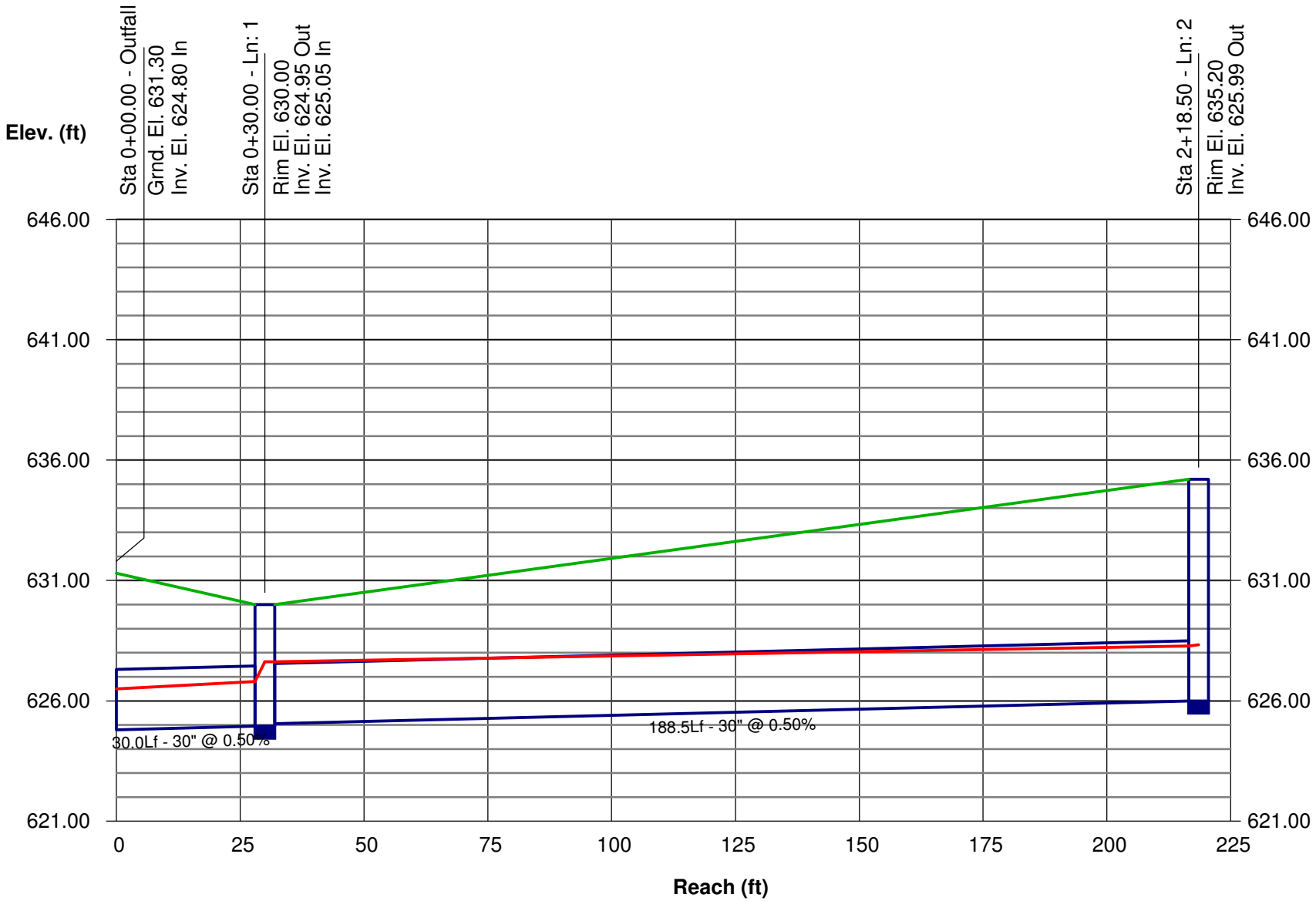
Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1		25.60	30 c	30.0	624.80	624.95	0.500	626.49	626.80	n/a	627.62 i	End
2		25.60	30 c	188.5	625.05	625.99	0.499	627.62	628.27	n/a	628.33 i	1
3	Area 4	1.60	12 c	38.0	626.09	626.28	0.500	628.33*	628.41*	0.06	628.47	2
4		24.00	30 c	268.0	626.09	627.43	0.500	628.33	629.15	n/a	630.09 i	2
5	Area 3	24.00	30 c	37.0	627.53	627.62	0.243	630.09*	630.21*	0.06	630.27	4
6		20.68	24 c	89.0	627.82	628.27	0.506	630.27*	631.01*	n/a	631.02 i	5
7	Area 2	7.85	18 c	47.0	628.37	628.61	0.511	631.02*	631.29*	0.31	631.59	6
8	Area 1	12.83	24 c	75.0	628.37	628.75	0.507	631.02*	631.26*	0.26	631.52	6
9		19.28	30 c	98.0	625.00	625.49	0.500	630.61*	630.83*	0.18	631.01	End
10	Area 9	8.17	18 c	30.0	631.20	631.50	1.000	632.19	632.59	n/a	633.46 i	9
11		11.11	24 c	61.0	625.60	625.91	0.508	631.05*	631.20*	0.19	631.39	9
12	Area 8	1.56	12 c	30.0	626.00	626.15	0.500	631.53*	631.58*	0.06	631.65	11
13		9.55	24 c	30.0	626.00	626.15	0.500	631.44*	631.50*	0.14	631.64	11
14	Area 7	3.21	12 c	35.0	626.25	626.43	0.514	631.64*	631.93*	0.26	632.19	13
15		6.34	18 c	165.0	626.25	627.08	0.503	631.64*	632.24*	0.20	632.44	13
16	Area 6	3.21	12 c	35.0	627.18	627.36	0.514	632.44*	632.73*	0.26	632.99	15
17		3.13	12 c	195.0	627.18	628.16	0.503	632.44*	633.95*	0.25	634.20	15
18	Area 5	3.13	12 c	35.0	628.26	628.44	0.514	634.20*	634.47*	0.25	634.71	17

Project File: Pio Pico - Otay - Storm Sewer - 100 Year.stm | Number of lines: 18 | Run Date: 01-14-2011

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

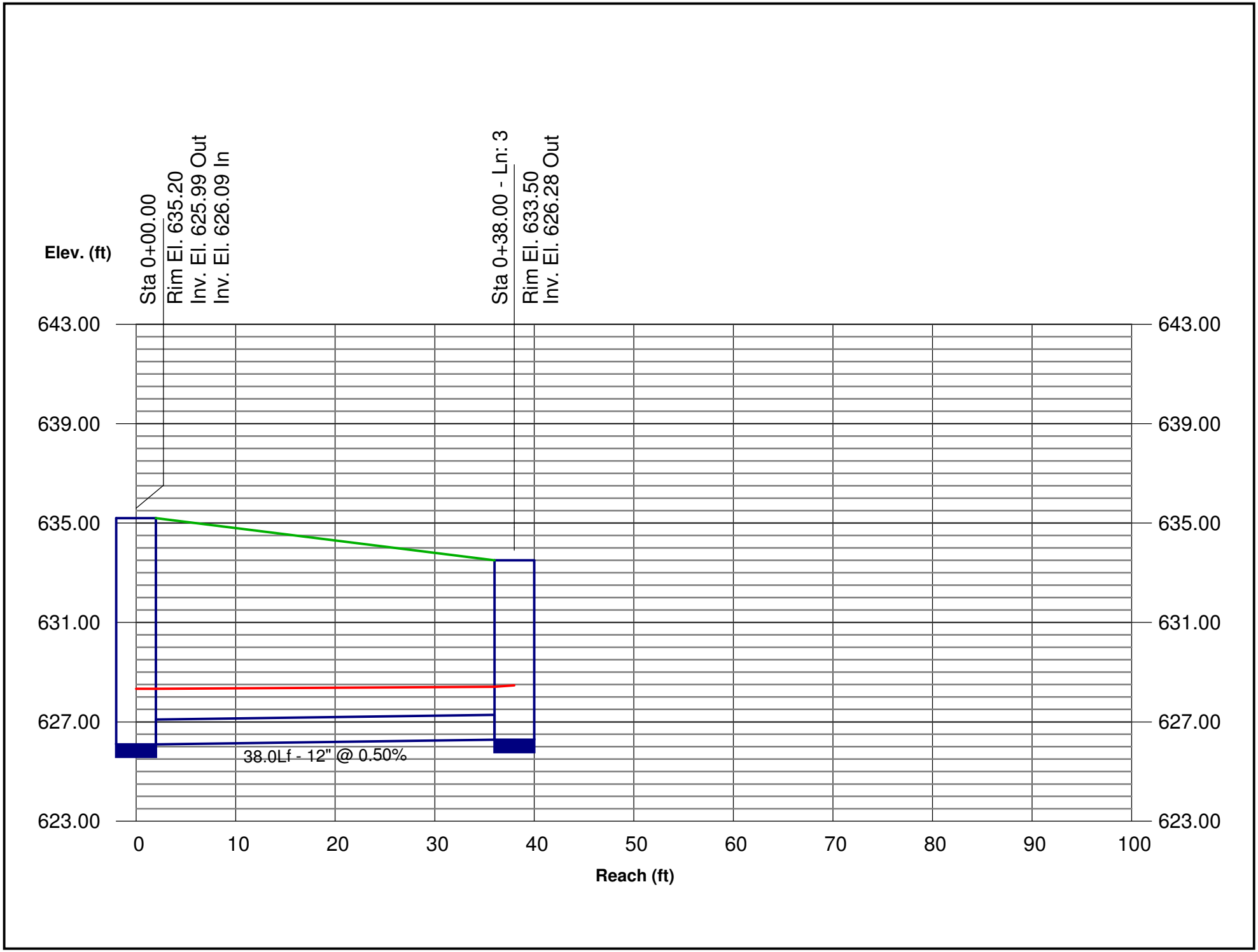
Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



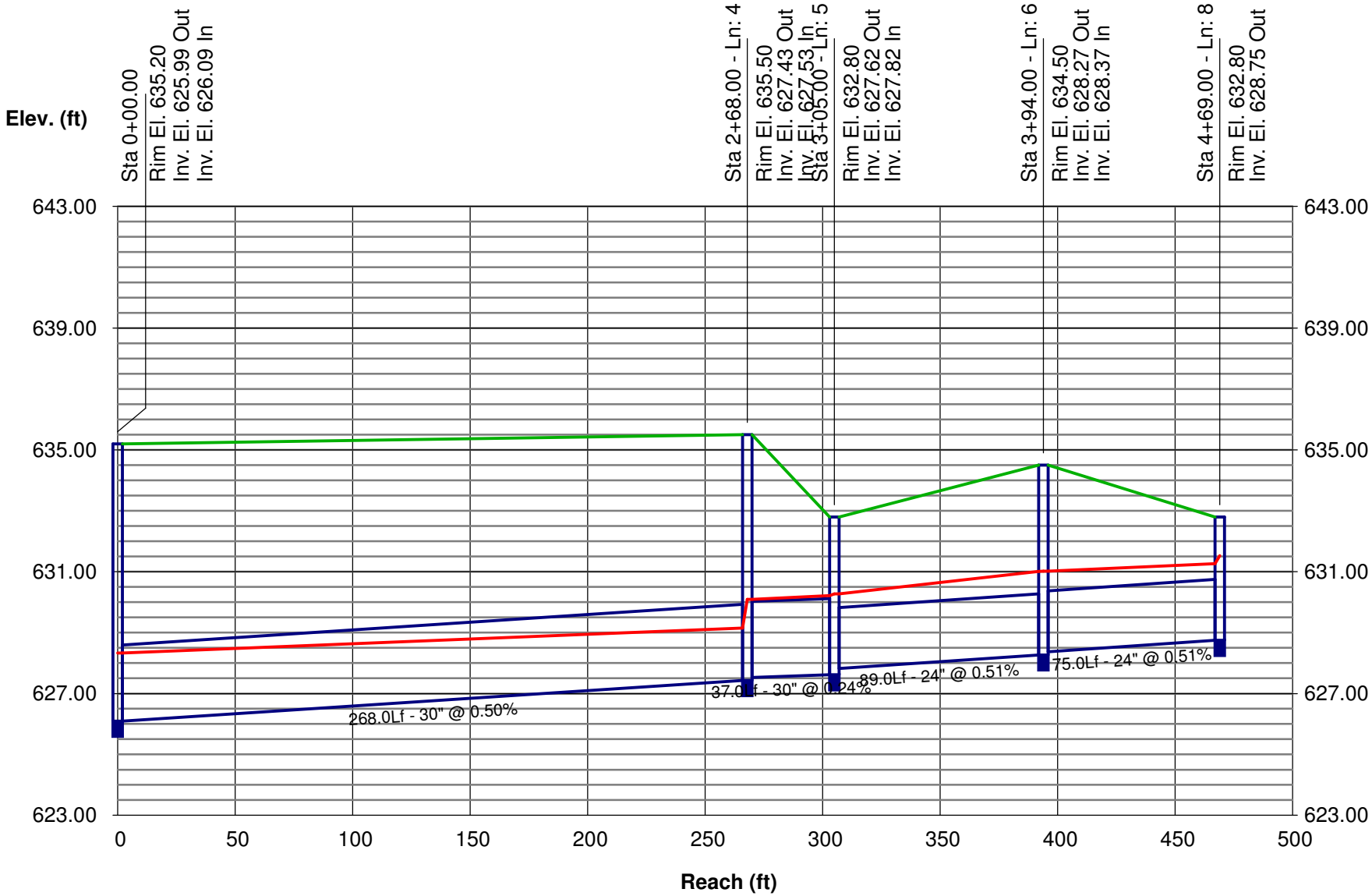
Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



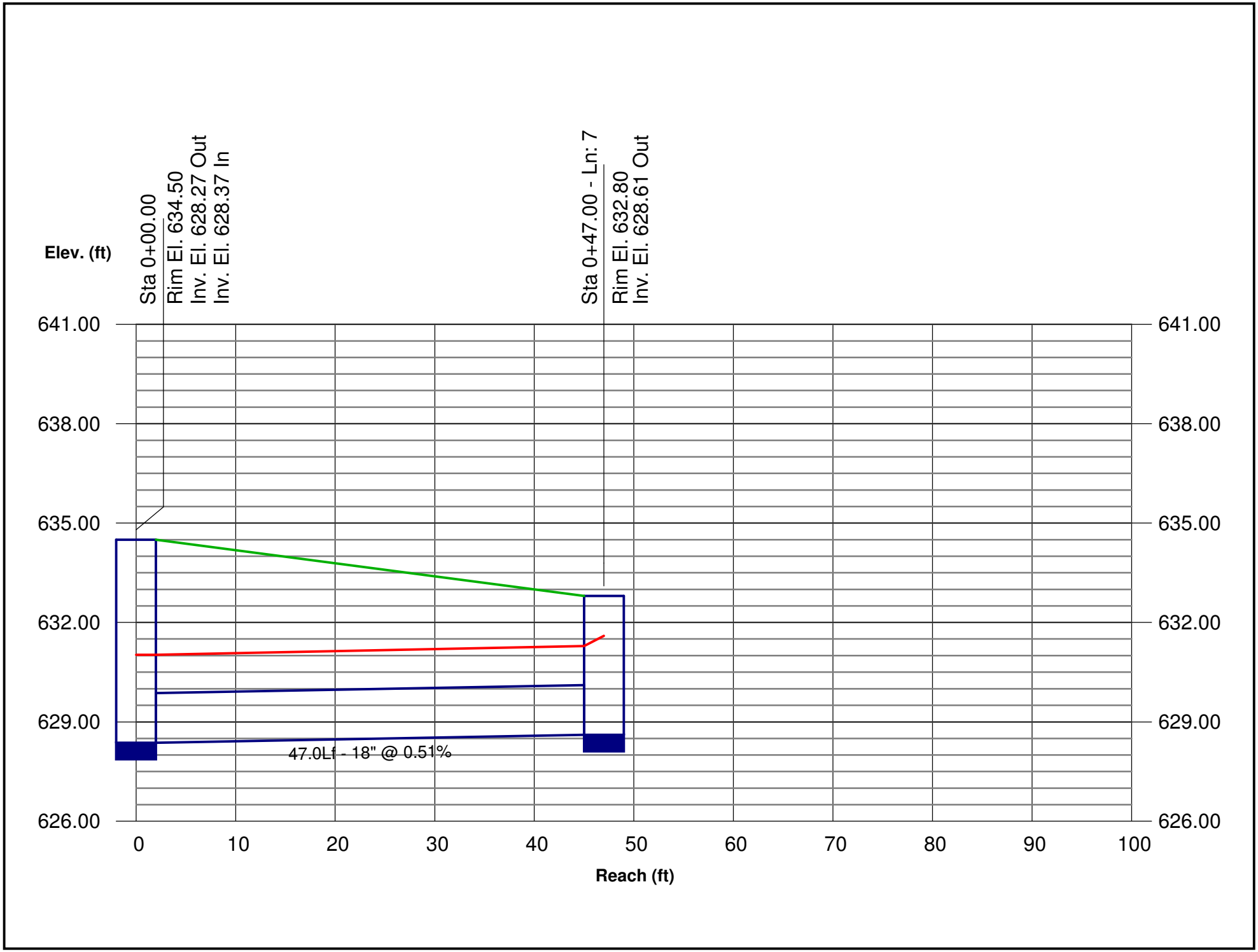
Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



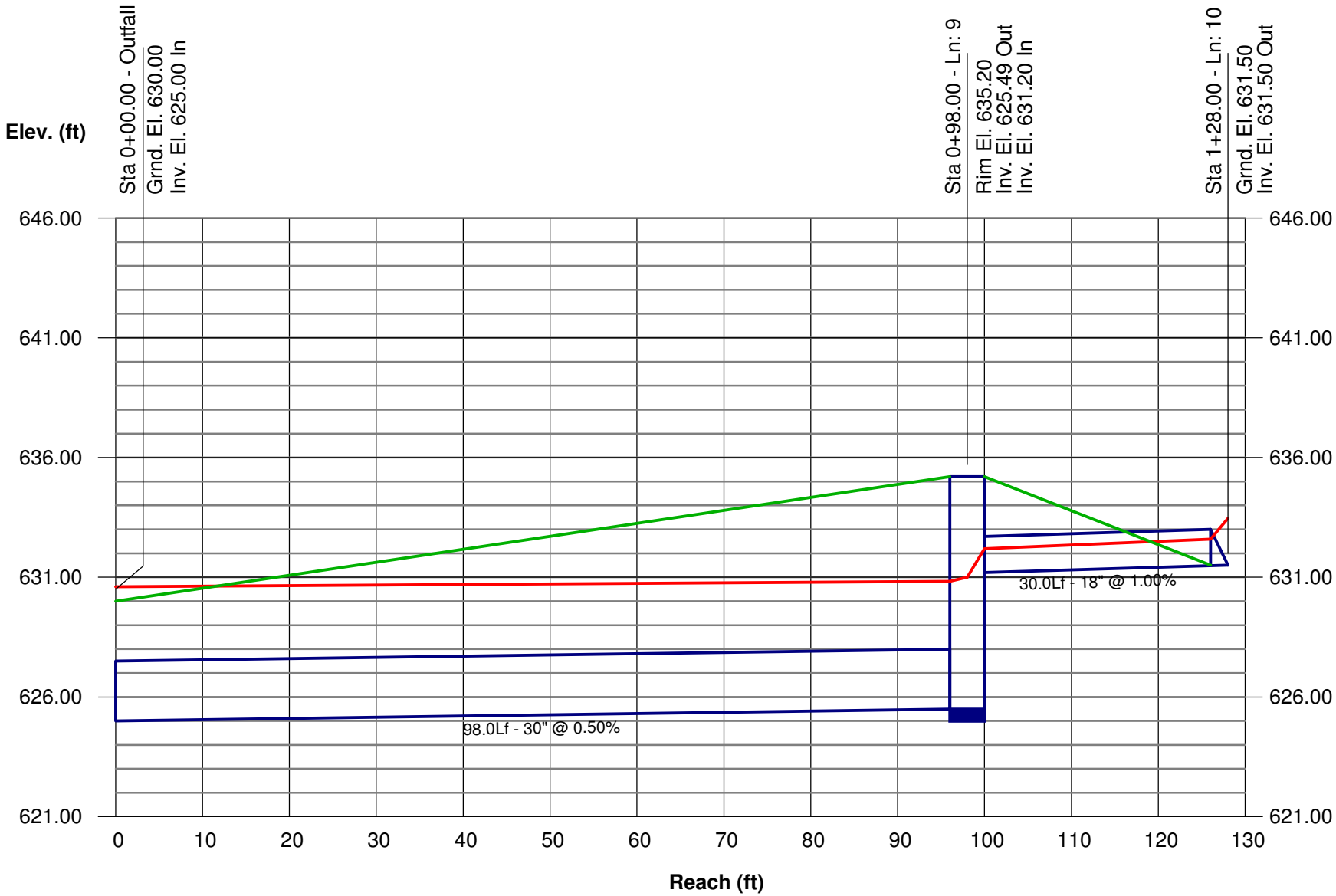
Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



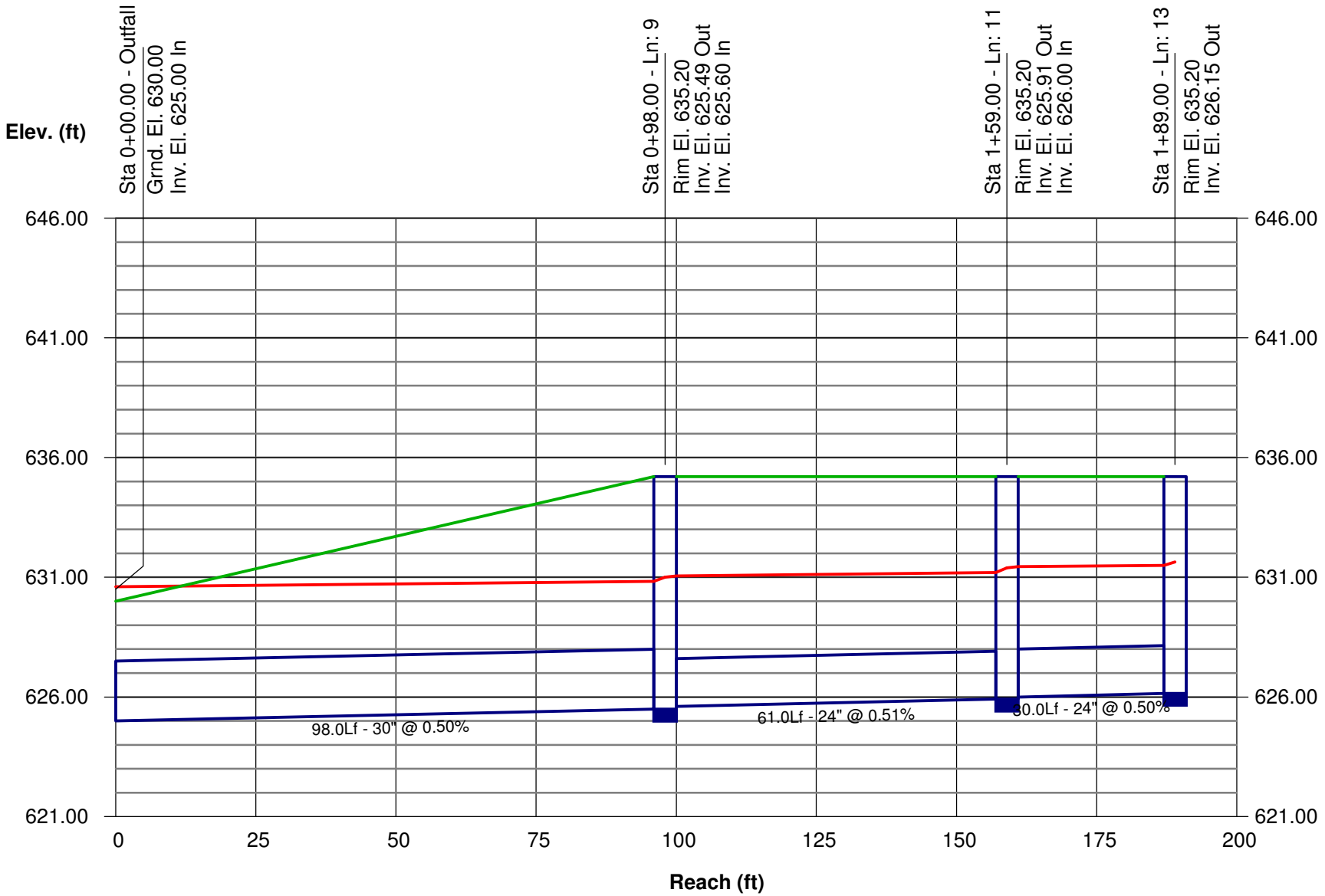
Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



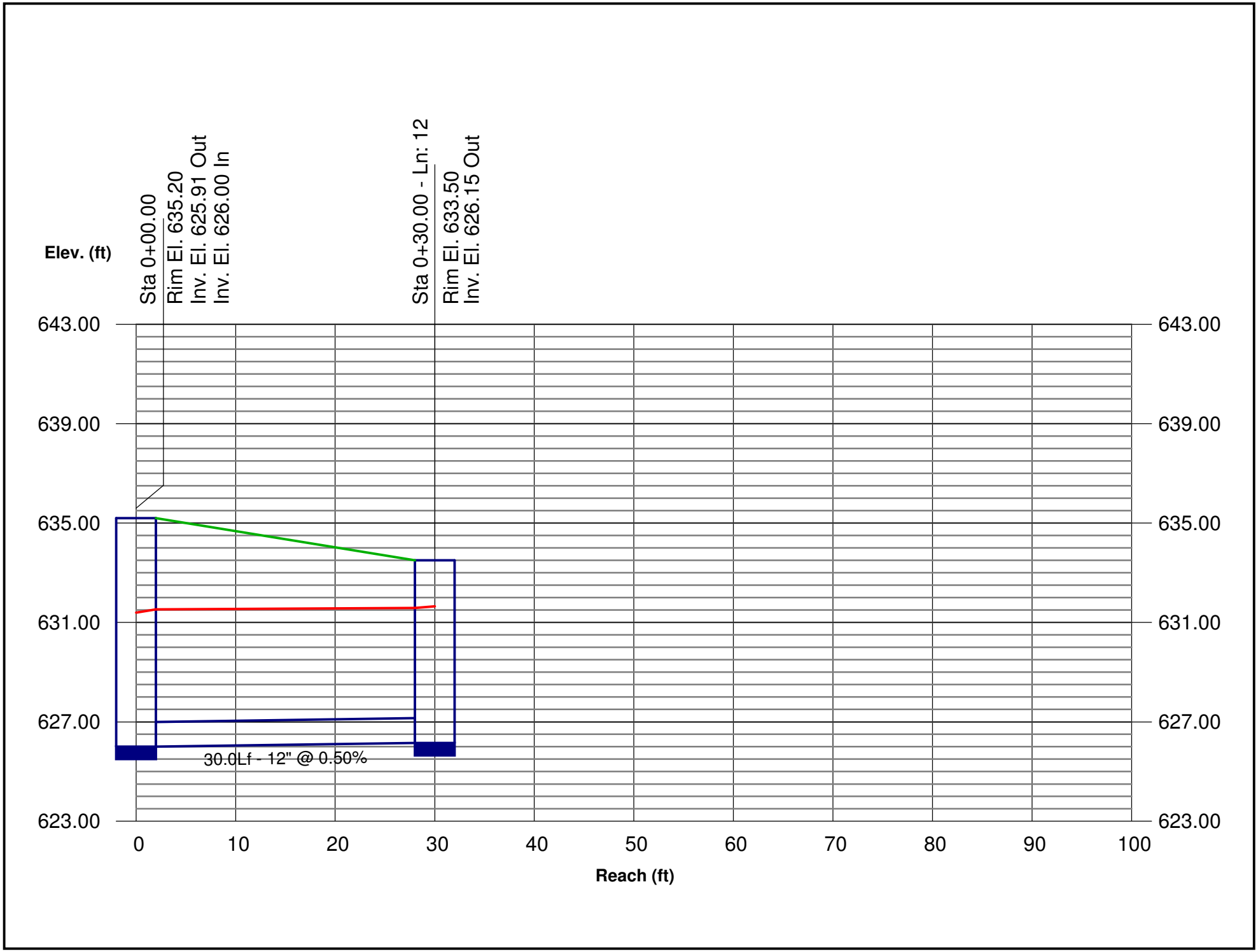
Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



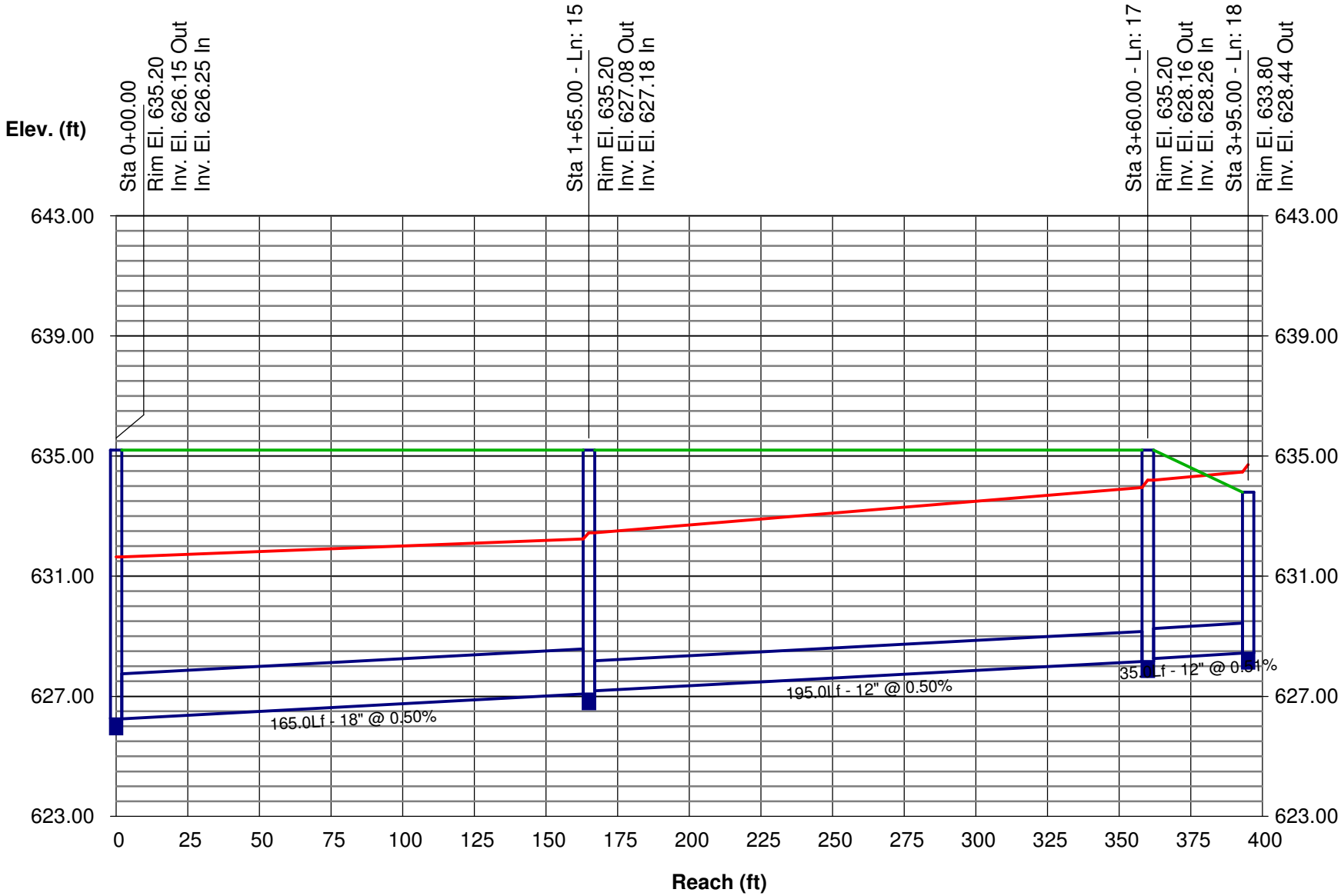
Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



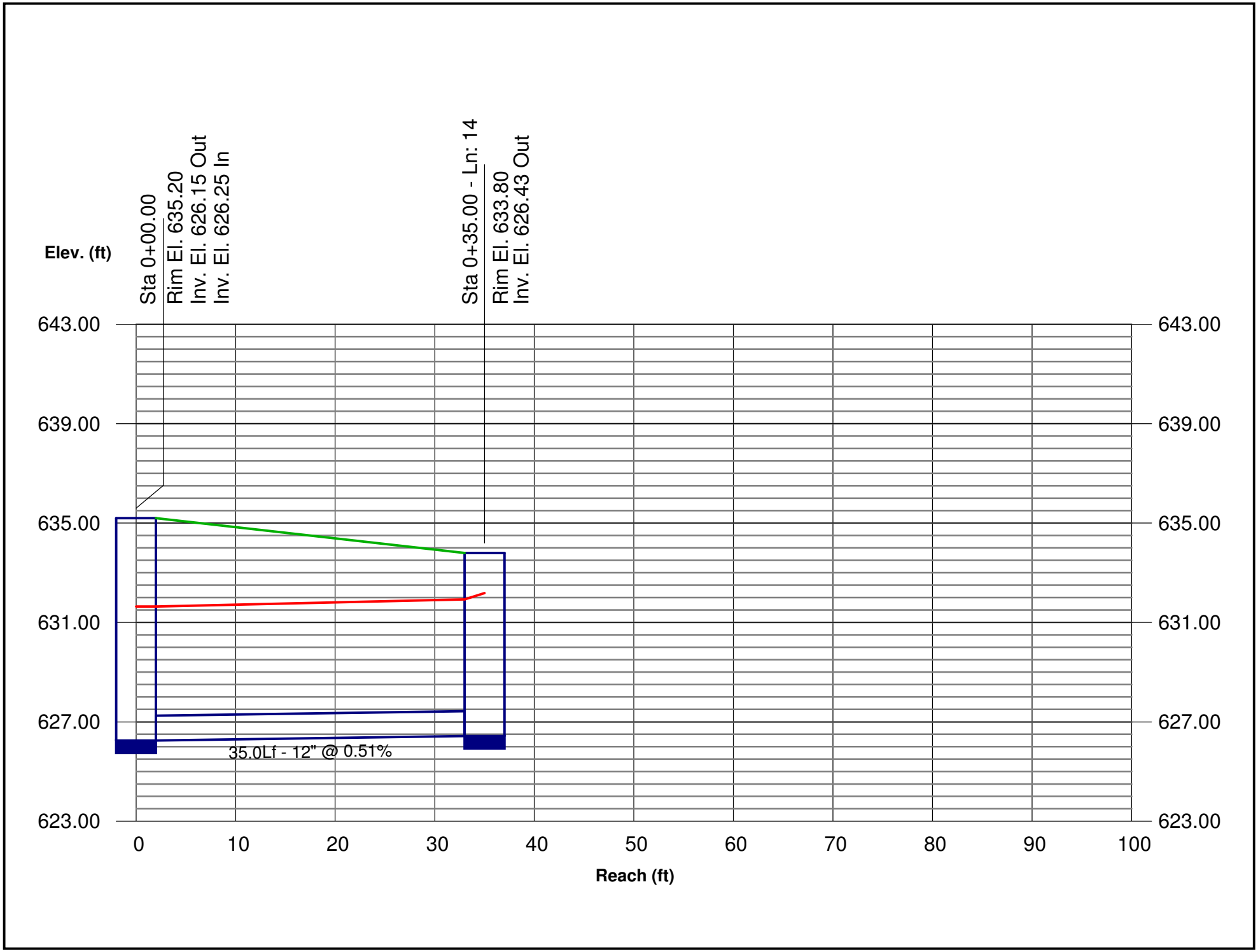
Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



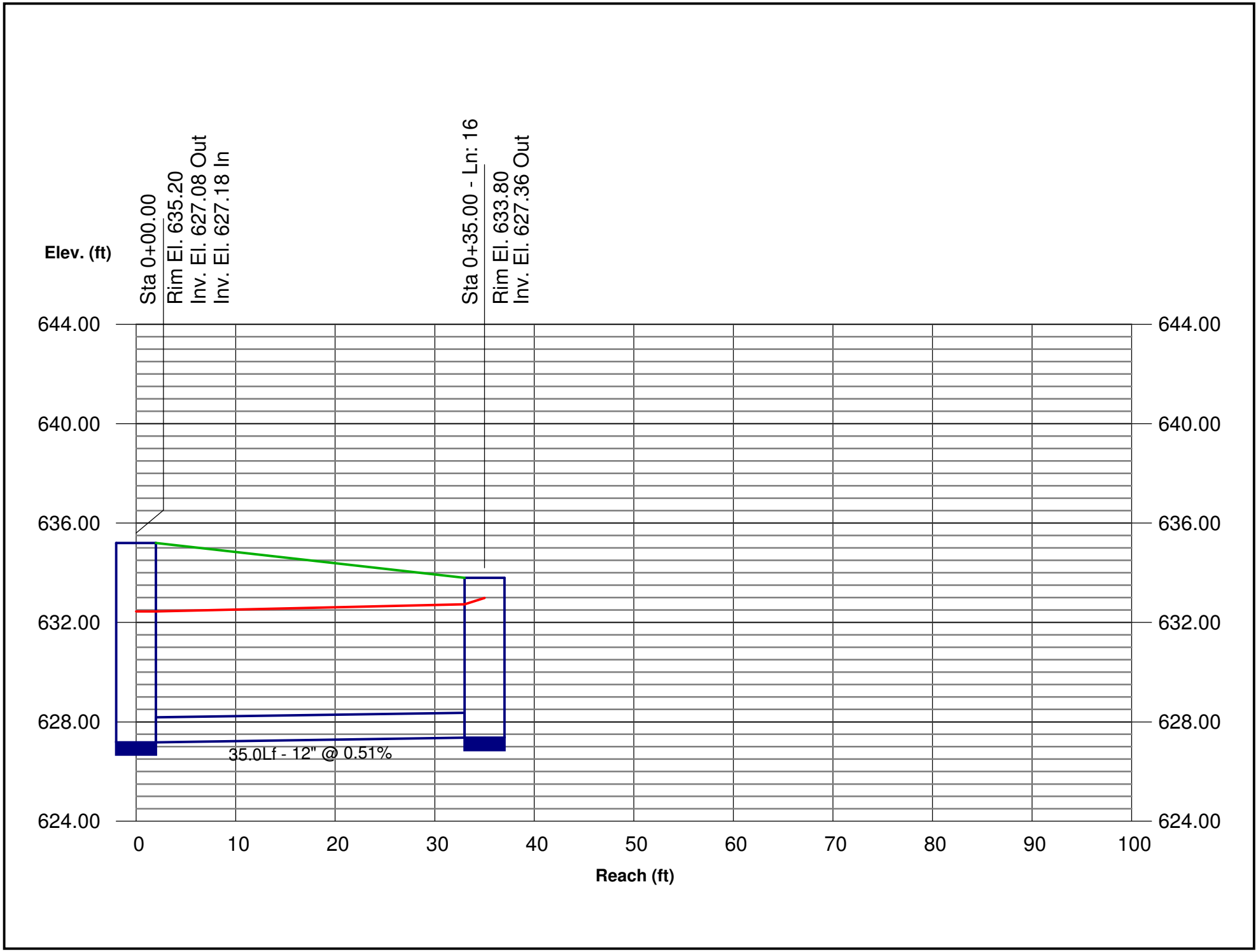
Storm Sewer Profile

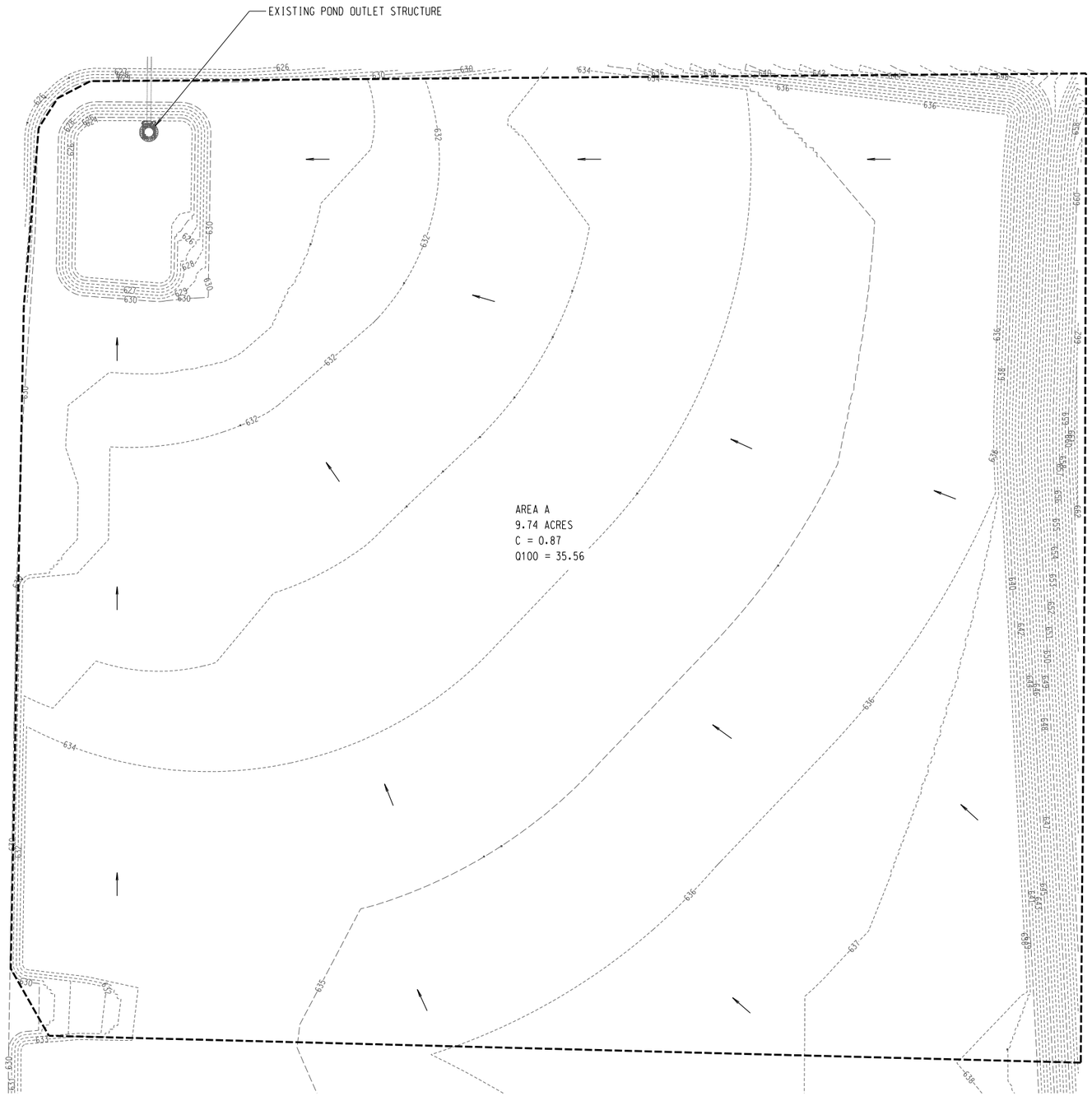
Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm





N

40 0 40 80

SCALE IN FEET

SCALE: 1" = 40'-0"

– PRELIMINARY –
NOT FOR CONSTRUCTION

CONFIDENTIAL

THESE DRAWINGS ARE CONFIDENTIAL IN NATURE. ANY MISUSE OR UNAUTHORIZED DISTRIBUTION OF THE DRAWINGS CONTAINED HEREIN WILL BE A VIOLATION OF THIS CONFIDENTIALITY REQUIREMENT AND SUBJECT THE VIOLATOR TO LIABILITY. REVIEW OF THESE MATERIALS BY RECIPIENT SHALL CONSTITUTE AN ACCEPTANCE OF THESE TERMS AND THE TERMS OF ANY UNDERLYING CONFIDENTIALITY AGREEMENT WE MAY HAVE EXECUTED IN OBTAINING THIS INFORMATION FROM A THIRD PARTY. IF THE RECIPIENT IS NOT IN AGREEMENT WITH THE OBLIGATION OF CONFIDENTIALITY THEN THE DRAWINGS SHALL BE RETURNED TO THE ORIGINATOR.

REV	DESIGN BY	DRAWN BY	CHECKED BY	DATE
A	ISSUED FOR REVIEW			
	S. BADDELEY	S. COOK	S. MOORE	01-14-11

PIO PICO ENERGY CENTER

3 x GE LMS100
SAN DIEGO COUNTY, CALIFORNIA

Kiewit

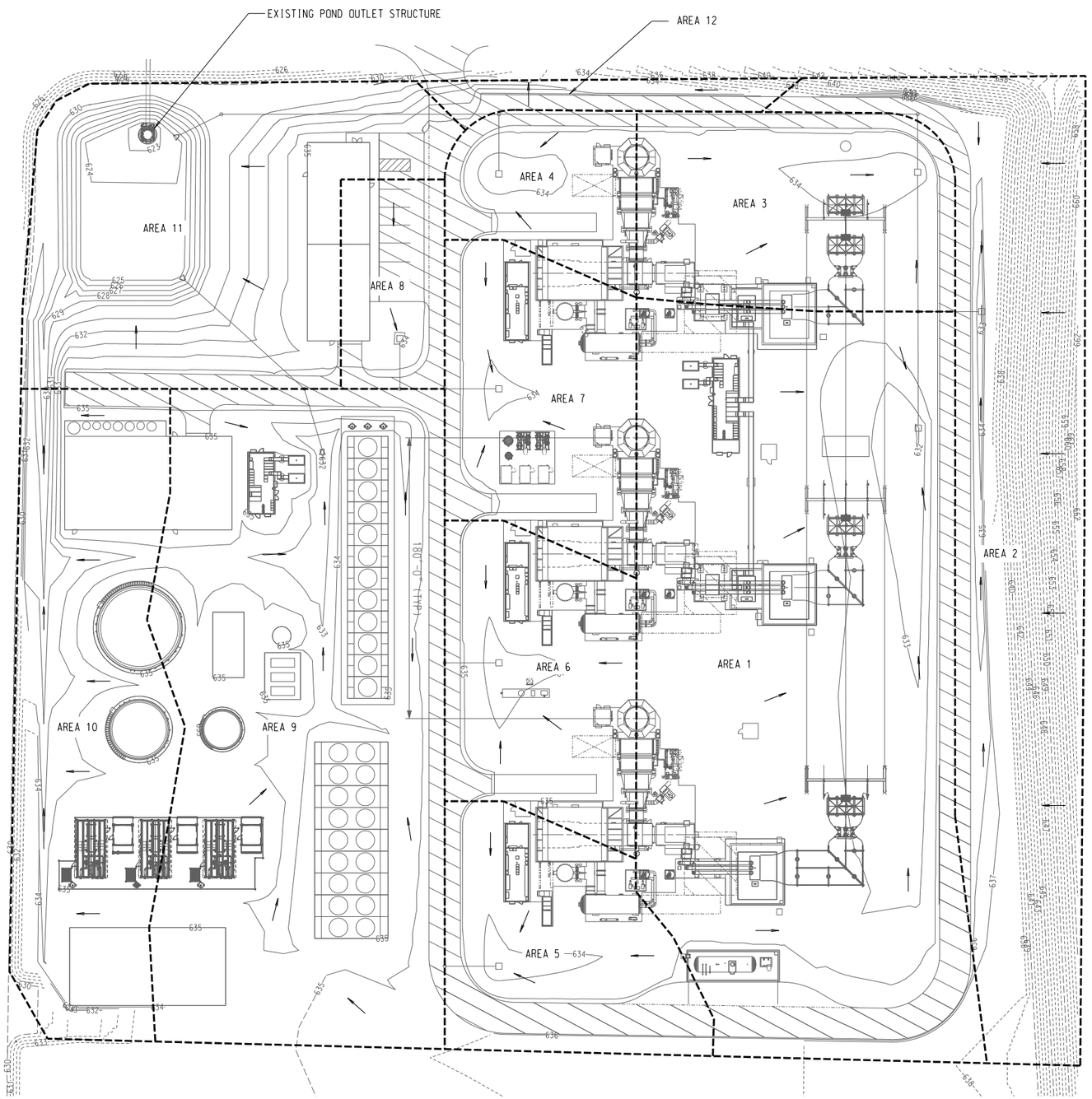
Kiewit Power
9401 Renner Boulevard
Lenexa, Kansas 66219

PRE-DEVELOPMENT DRAINAGE MAP

ENGINEER/DESIGN ORIGINATOR	S. BADDELEY
LEAD ENG	S. BADDELEY
ENG MGR	C. KEBODEAUX
PROJ MGR	E. ELAM

DRAWING NUMBER

P009-041-CM-002



POST DEVELOPMENT WATERSHEDS

HYDROLOGIC ANALYSIS OF THE 100 YEAR STORM

Watershed	Area (acres)	Runoff Coefficient	Discharge 100-Year (cfs)
1	2.22	0.81	12.83
2	1.23	0.78	7.85
3	0.58	0.70	3.32
4	0.26	0.75	1.60
5	0.49	0.78	3.13
6	0.51	0.77	3.21
7	0.51	0.77	3.21
8	0.21	0.91	1.56
9	1.74	0.74	8.17
10	0.90	0.73	5.38
11	0.99	0.78	6.32
12	0.11	0.88	0.79

40 0 40 80

SCALE IN FEET

SCALE: 1" = 40'-0"

N

– PRELIMINARY –
NOT FOR CONSTRUCTION

CONFIDENTIAL

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REV	DESIGN BY	DRAWN BY	CHECKED BY	DATE
A	S. BADDELEY	S. COOK	S. MOORE	01-14-11

ISSUED FOR REVIEW

PIO PICO ENERGY CENTER

3 x GE LMS100
SAN DIEGO COUNTY, CALIFORNIA

Kiewit

Kiewit Power
9401 Renner Boulevard
Lenexa, Kansas 66219

POST-DEVELOPMENT DRAINAGE PLAN

ENGINEER/DESIGN ORIGINATOR	S. BADDELEY
LEAD ENG	S. BADDELEY
ENG MGR	C. KEBODEAUX
PROJ MGR	E. ELAM

DRAWING NUMBER

P009-041-CM-003

DRAINAGE STUDY
FOR
THE GRADING OF
PARCEL Nos. 1 & 2, PACEL MAP No. 20473
APN 648-040-44

WEST OF OTAY GENERATING PLANT
ALTA ROAD
EAST OTAY MESA
COUNTY OF SAN DIEGO

November 4, 2009

Prepared by: _____ 11-15-09

Bartolome J. Pastor
R.C.E. No. 38606, Exp. 3/31/09

Date

REGISTERED PROFESSIONAL ENGINEER
BARTOLOME J. PASTOR
R.C.E. No. 38606
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CIVIL
STATE OF CALIFORNIA

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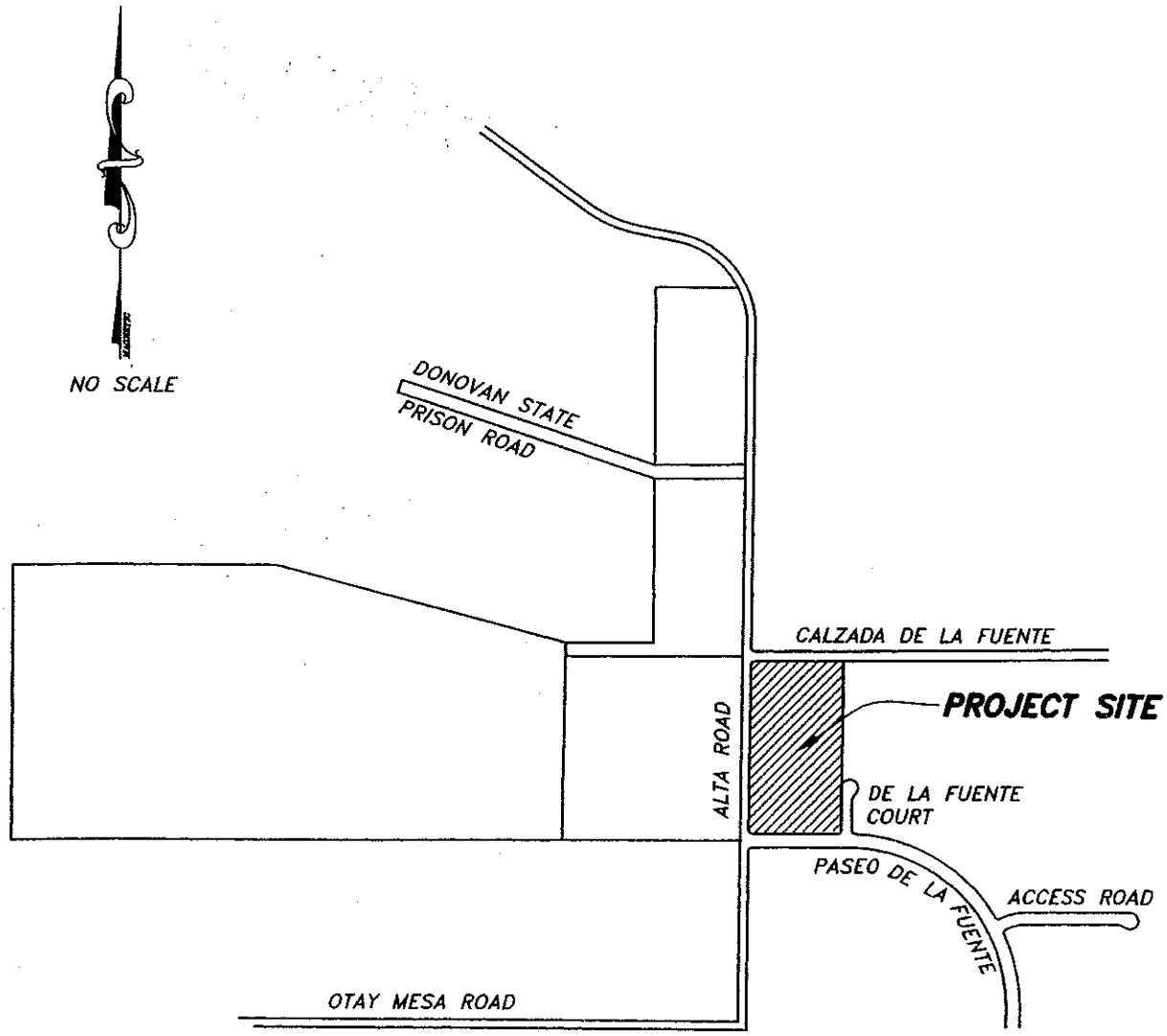
4901 Morena Blvd., Suite 409, San Diego CA 92117, Tel. (858) 581-6101, FAX (858) 581-6138

Appendix C:

Pre-Development Drainage Study

By Alta Consultants



PARCEL No. 1 & 2

VICINITY MAP

NO SCALE

INTRODUCTION

This drainage study is being prepared to analyze the post-development runoff in connection with the proposed grading plan for Parcels 1 & 2. The project is approximately 19.67 acres within its boundaries located west of the Generating Plant bounded by Calazada De La Fuente to the north, Paseo De La Fuente to the south and Alta Road to the west. The hydrologic soil group classification is "D". The storm frequency for this report is based on the 100-year storm. The project is located approximately 1.6 miles north of the United States/Mexican border.

PROCEDURE

Storm drainage calculation is based on the Rational Method of the San Diego County Drainage Manual, June, 2003 Edition. The project is in the heavy industrial zone having a post-development runoff coefficient of C = 0.87 and pre-development runoff coefficient of C=0.35. Runoff from the parcels sheet flow into each individual detention basin that detains post-development storm water volume while discharging pre-development runoff through orifices at the level of the water surface elevation of treatment or at a rectangular slot located at the rim of the 48" CSP risers. The detained storm water volume will eventually be released at the maximum rate of the pre-development flow. During a sustained 100 year storm the head over the rim of the riser acts as a spillway to discharge runoff and prevent flooding. Detention basin conveyances are connected to existing drainage systems at Calzada De La Fuente and Paseo De La Fuente.

Table: Generated Runoff

	RUNOFF (Cfs)		
	Pre-Development	Post Development	% Increase
Parcel 1	11.96	35.56	197.17
Parcel 2	28.20	39.94	41.64

The detention basins detain water quality volume calculated in accordance with Numeric Sizing Treatment Standard -Volume-based BMP,s. The water will be treated and emptied within 40 to 70 hours draw down time through an orifice at the bottom of the ponds. The ponds are also provided with a sediment level gage for proper maintenance and disposal of sediment.

CONCLUSION

After hydrologic and hydraulic recalculations of all existing and proposed conveyances involved in the project, it appears that pipes are in pressure flow but there is no endanger of over topping inlets and cleanouts. The free board provides safety of over flooding the project.

TABLE, CHARTS & GRAPHS

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

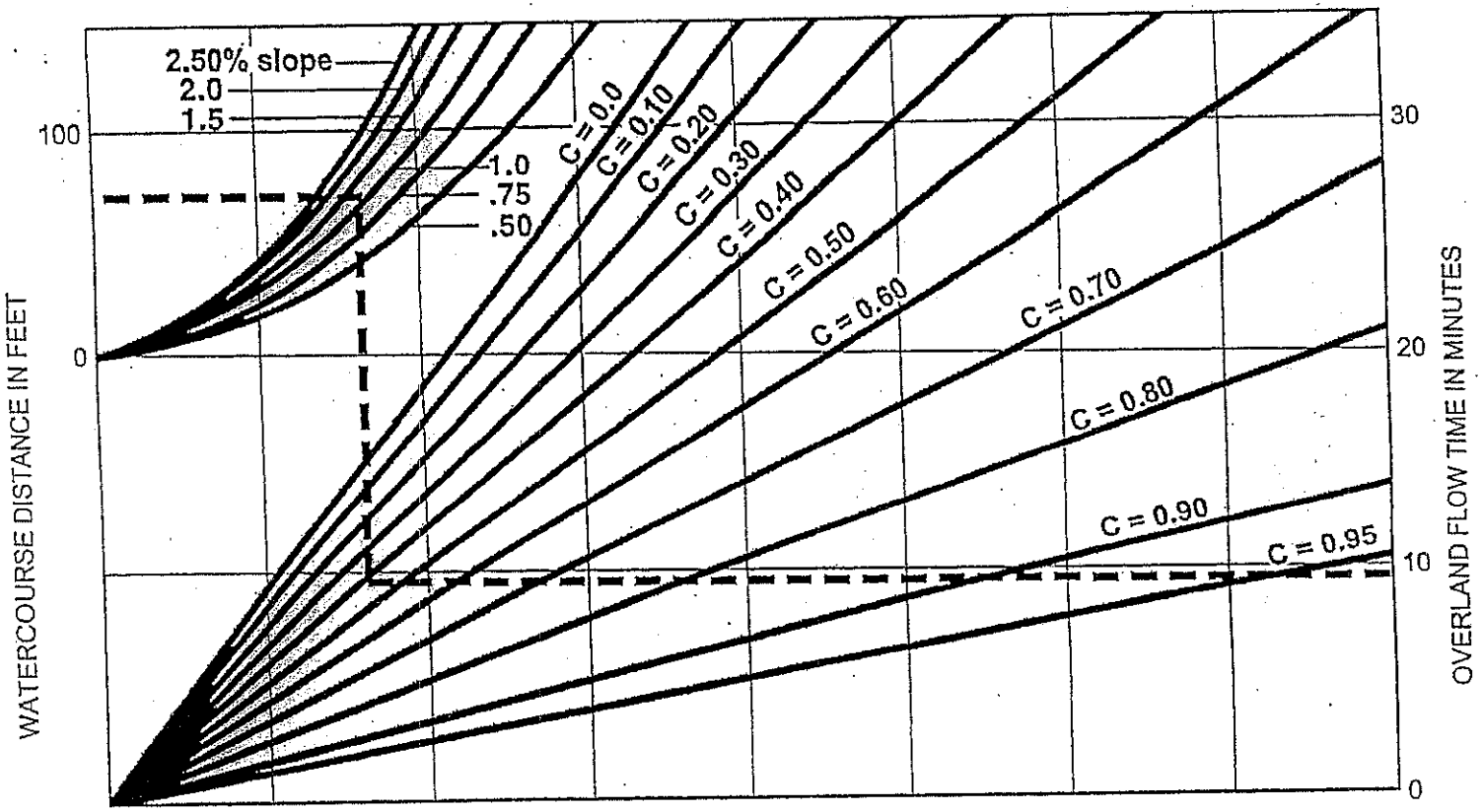
Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M) & INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/	.5%		1%		2%		3%		5%		10%	
	Acre	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description



EXAMPLE:

Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

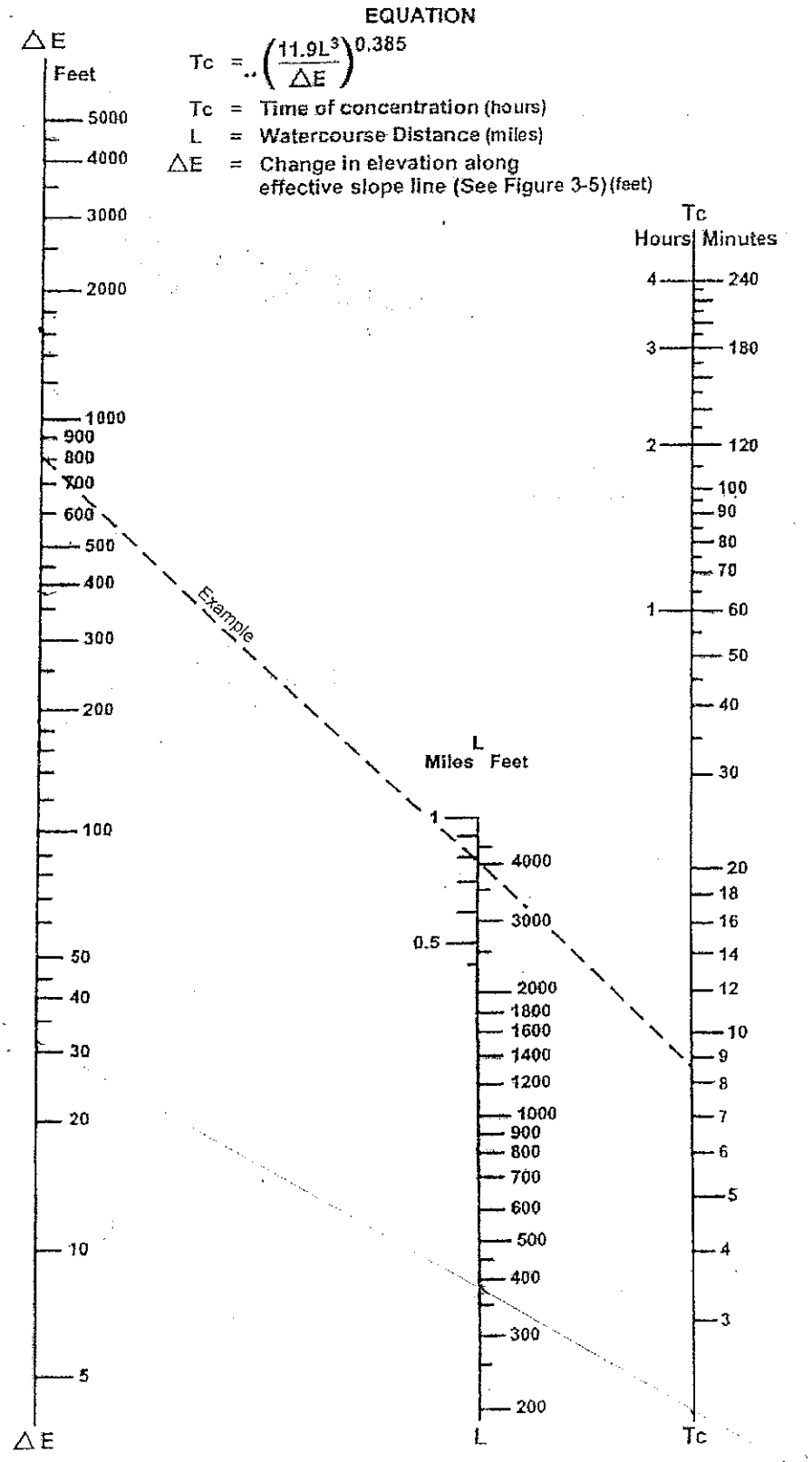
$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

FIGURE

3-3

Rational Formula - Overland Time of Flow Nomograph

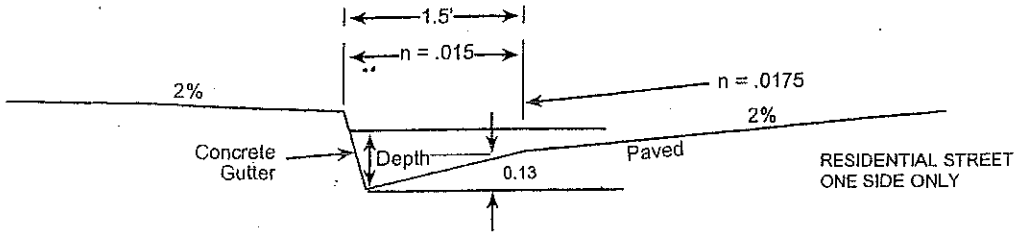


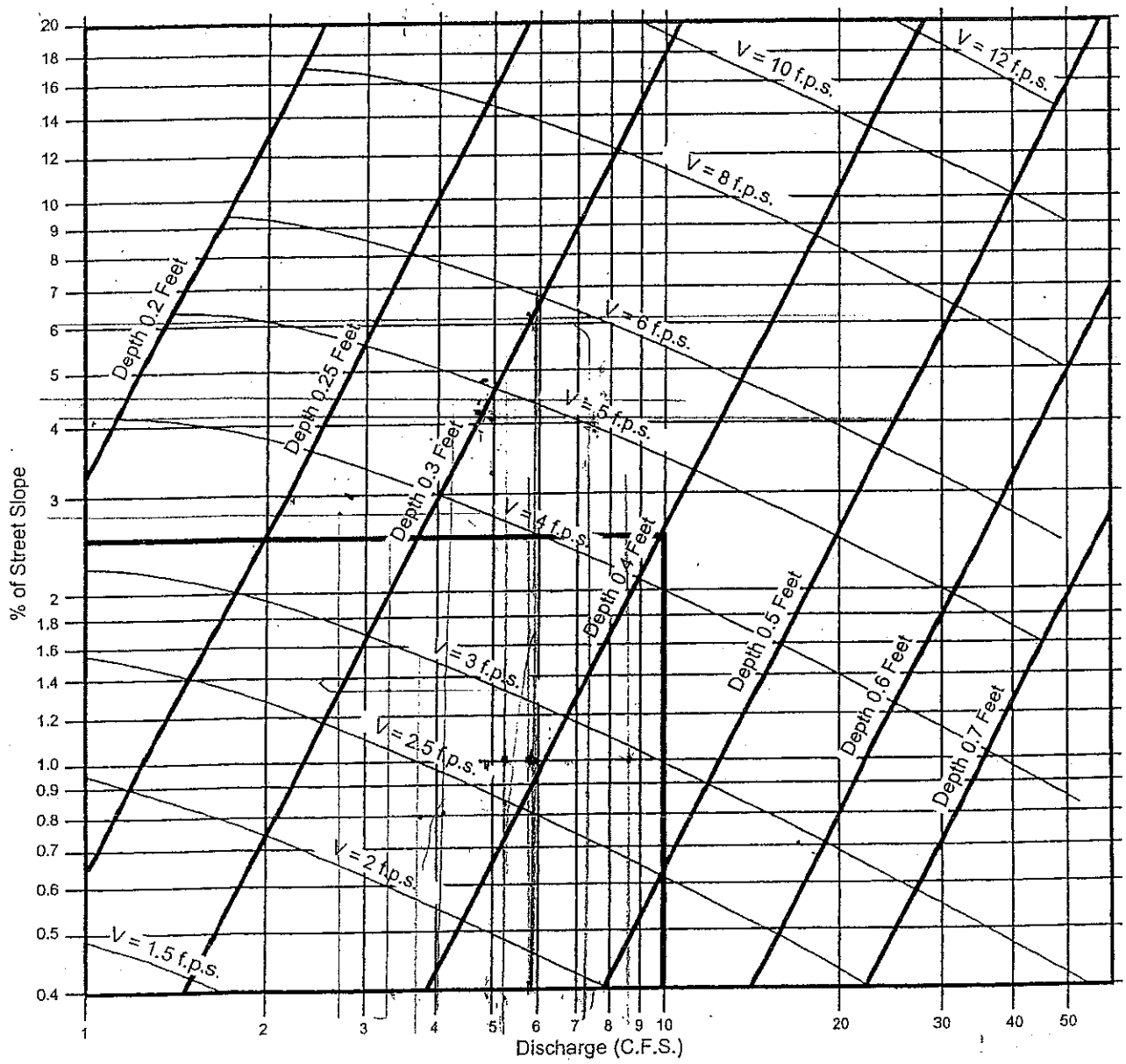
SOURCE: California Division of Highways (1941) and Kirpich (1940)

FIGURE

3-4

Nomograph for Determination of
Time of Concentration (Tc) or Travel Time (Tt) for Natural Watersheds





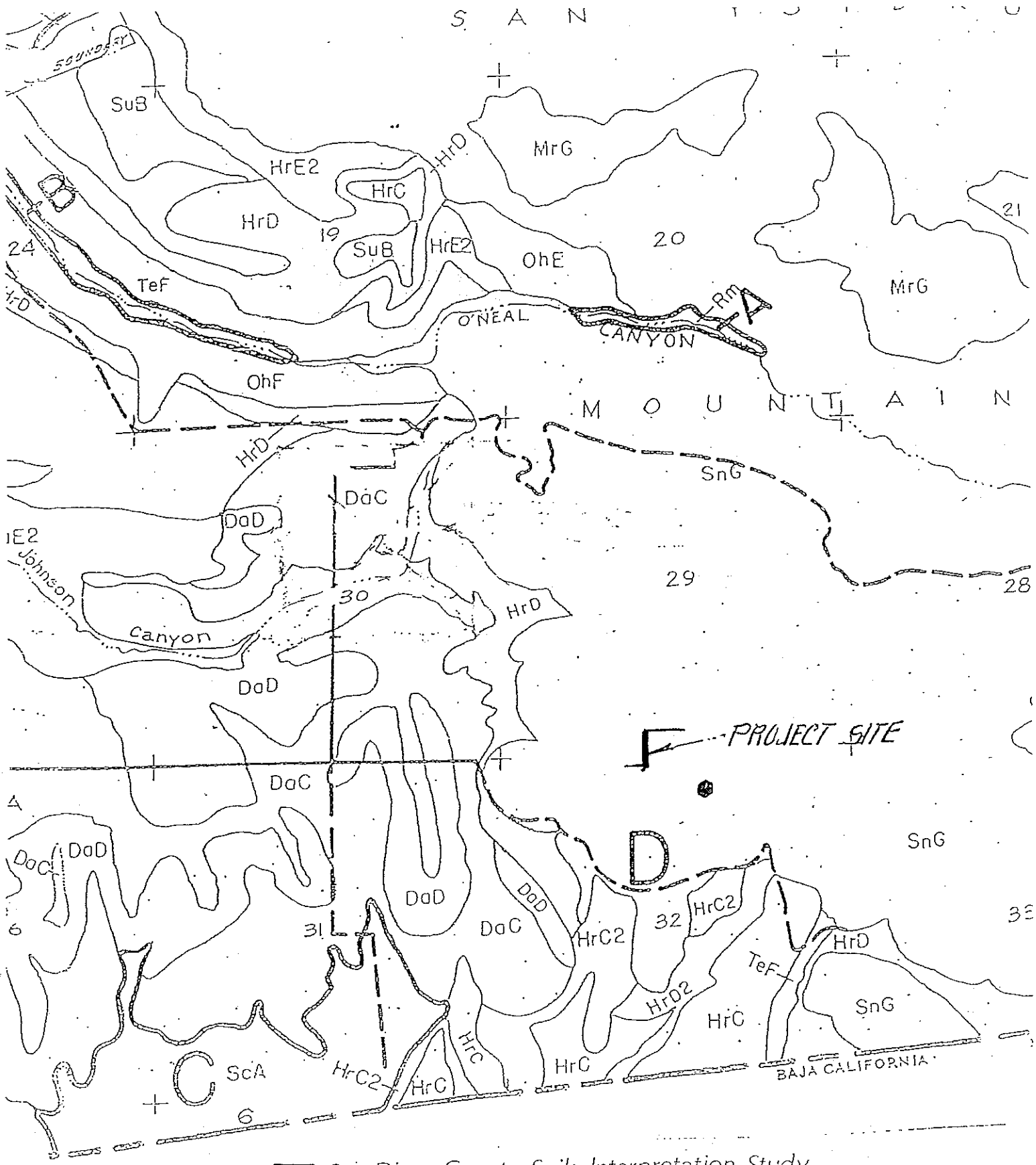
EXAMPLE:
Given: Q = 10 S = 2.5%
Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

SOURCE: San Diego County Department of Special District Services Design Manual

FIGURE

3-6

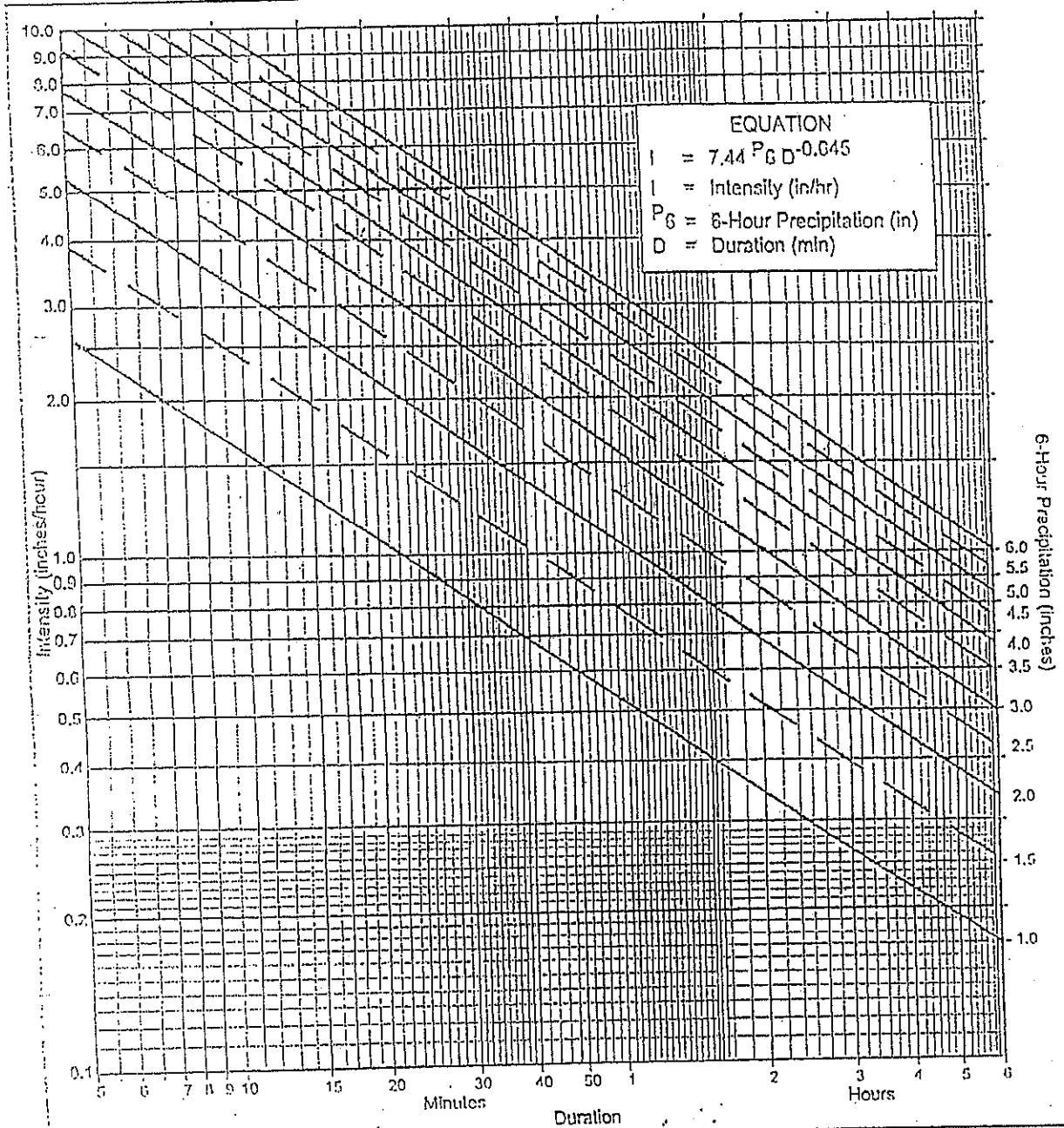
Gutter and Roadway Discharge - Velocity Chart



San Diego County Soils Interpretation Study

HYDROLOGIC SOIL GROUPS - Runoff Potential SEE CAUTION NOTE

Group A	Group B	Group C	Group D
Low Runoff Potential	B Moderate Runoff Potential	C High Runoff Potential	D Very High Runoff Potential



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicable to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 3 in., P_{24} = 7 $\frac{P_6}{P_{24}}$ 42.87%(2)

(c) Adjusted P_6(2) = 3.2 in.

(d) t_x = 10 min.

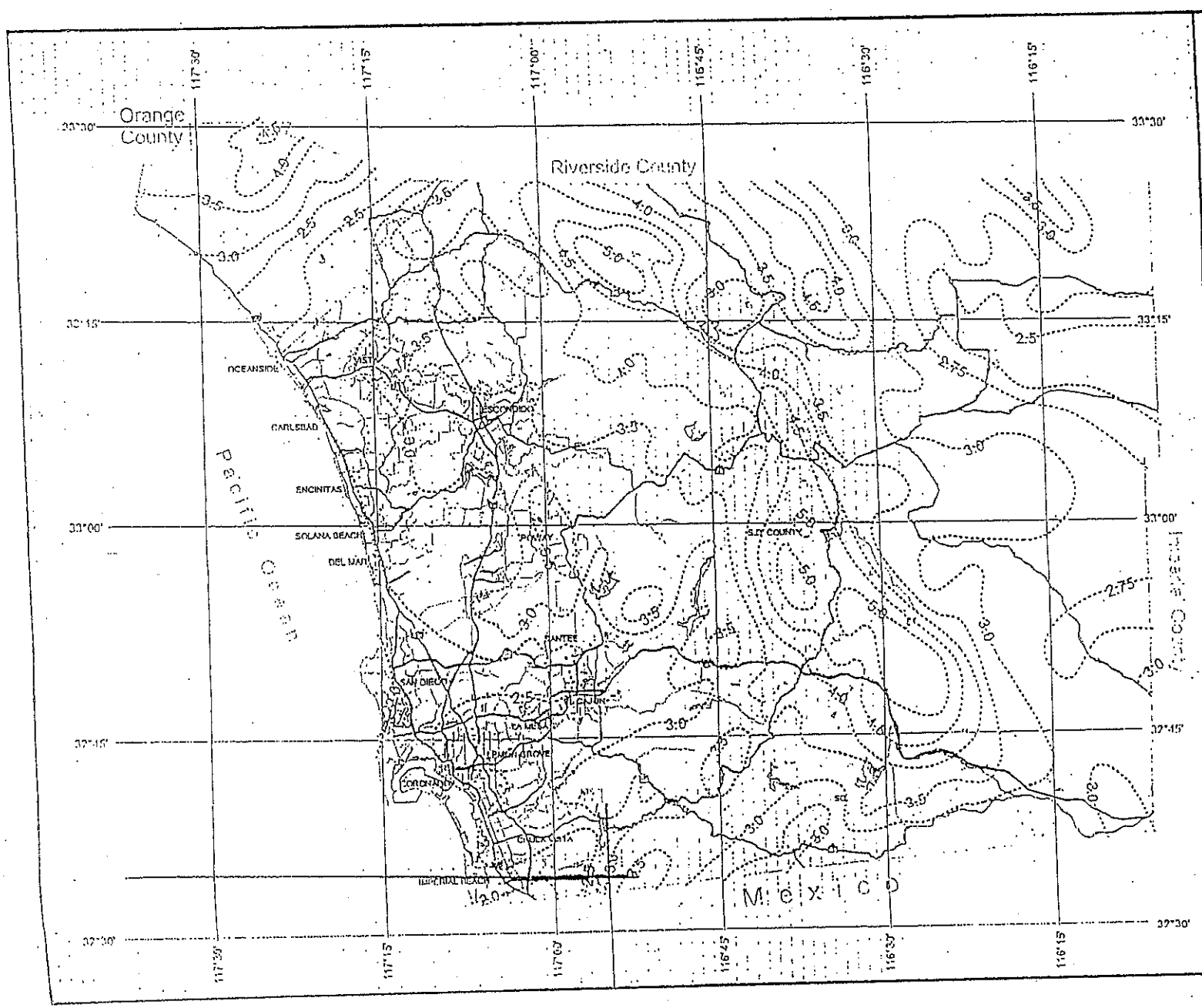
(e) I = 5.39 in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P_6 / Duration	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

LAT 116°55'00"
LONG 32°54'00"
$P_6 = 3.0$

DPW GIS

SanGIS

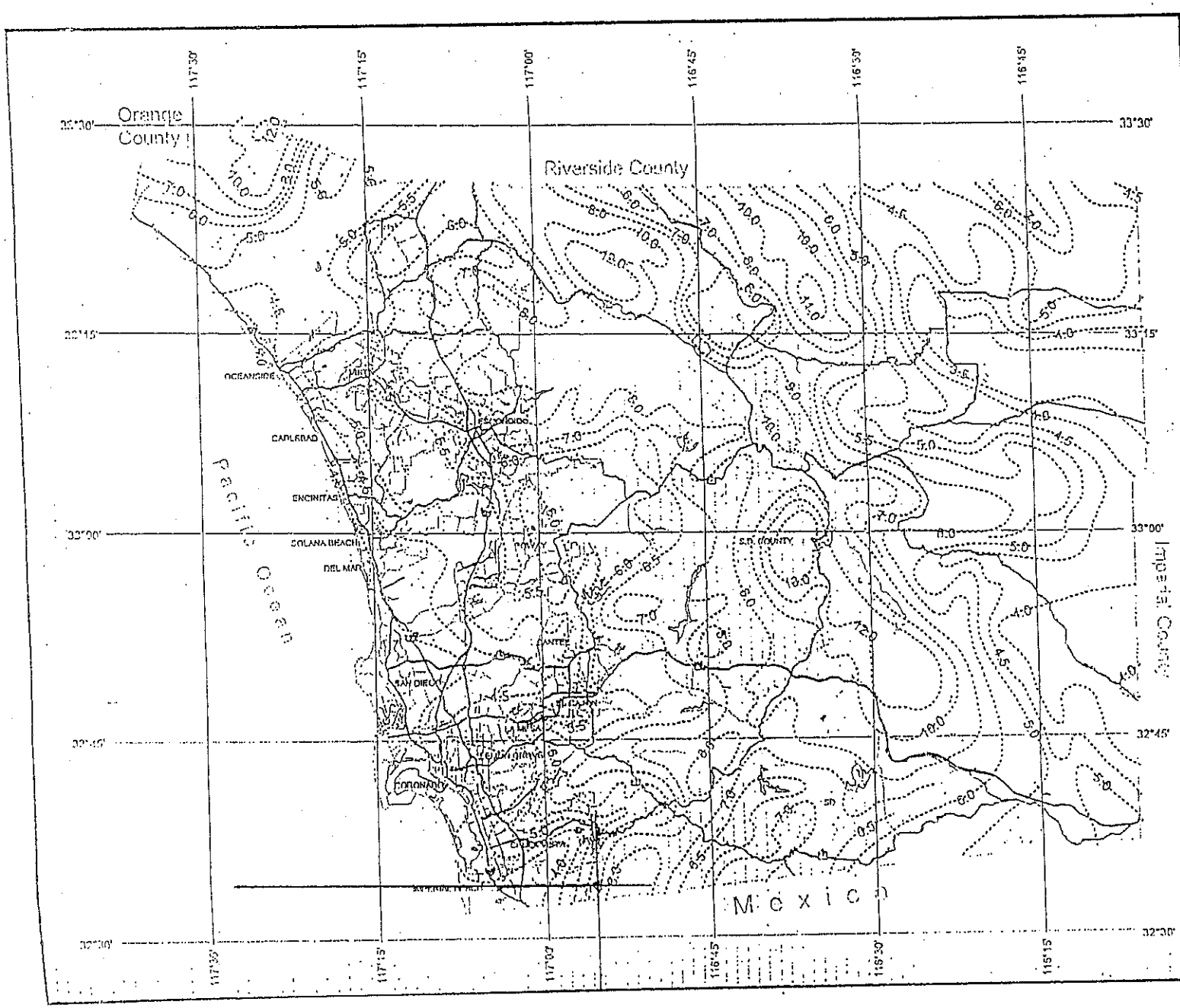
N

W

E

S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

LAT 116°55'00"
LONG 32°24'00
$P_{24} = 0.7$

DPW GIS

SANDIEGO GIS

N
W E
S

3 0 3 Miles

HYDROLOGY CALCULATION i

Project Name: PARCEL 1 & PARCEL 2

Location: East Otay Mesa

Job. No. 184-101

October 28, 2009

Storm Frequency = 100 Years

Soil Classification "C"		P_6 =	3.2	Fig. 3-1
PARCEL 1 (AREA A)				
PRE-DEVELOPMENT (Node 1 to Node 2)				
Watershed Area	Area =	6.8	Ac.	
Distance	L =	680.65	Ft	
High Elevation	Hi =	664.00		
Lo. Elevation	Lo =	621.80		
Difference in Elevation	△ =	42.20	Ft	
Effectrive Slope	So =	6.20%		
Max. Overland Flow Distance	Lm =	100.00	Ft	Table 3-2
Intial Time Travel	Ti =	8.27	Min.	Extrapolated
Remaining Dist. To Travel	Lr =	580.65	Ft	
Remaining Time to Travel	Tr =	2.88	Min.	
Total Time of Concentration	Tc =	11.15	Min.	
Intensity	I =	5.03	Ins/Hr.	
Runo Coefficient	C =	0.35		
Pre- Runoff	Qn =	11.96	Cfs	
POST DEVELOPMENT (Industrial)				
(AREA ~ A)		Acres (Ac.)	Runoff C	
Watershed Area	A =	9.6	0.87	
Distance Travel	L =	795	Ft	
Effective Slope	S =	1.00%		
Initial Time Traveled =	Ti =	3.20	Min.	Table 3-2
Max. Overland Flow Distance	Lm =	60.00	Ft.	Extrapolated
Remaining Distance to Travel	Lr =	735.00	Ft.	
Remaining Time to Travel	Tr =	11.22	Min.	See Fig. 3-3
Total Time of Concentration	Tc =	14.42	Min.	
Intensity	I =	4.26	Ins/hr.	
C x A	CA =	8.35		
Designed Runoff	Q =	35.56	Cfs	
PARCEL 2 (AREA B)				
PRE-DEVELOPMENT (Node 1 to Node 3)				
		Acres (Ac.)	Runoff C	
Watershed Area	A =	12.9	0.35	
Distance Travel	L =	1,138.00	Ft	
High Elevation	Hi =	667.50		
Lo. Elevation	Lo =	614.70		
Difference in Elevation	△ =	52.80	Ft	
Effectrive Slope	So =	4.64%		
Max. Overland Flow Distance	Lm =	88.20	Ft	Table 3-2
Intial Time Travel	Ti =	2.65	Min.	Extrapolated
Remaining Dist. To Travel	Lr =	1,049.80	Ft	
Remaining Time to Travel	Tr =	5.23	Min.	
Total Time of Concentration	Tc =	7.89	Min.	

HYDROLOGY CALCULATION i

Project Name: PARCEL 1 & PARCEL 2

Location: East Otay Mesa

Job. No. 184-101

Storm Frequency = 100 Years

October 28, 2009

Intensity	I =	6.28	Ins/Hr.	
Runo Coefficient	CA =	4.52		
Pre- Runoff	Qn =	28.37	Cfs	
POST DEVELOPMENT (Industrial)				
(AREA ~ B)		Acres (Ac.)	Runoff C	
Watershed Area	A =	9.6	0.87	
Distance Travel	L =	821	Ft	
Effective Slope	S =	1.85%		
Initial Time Traveled =	Ti =	2.78	Min.	Table 3-2
Max. Overland Flow Distance	Lm =	68.50	Ft.	Extrapolated
Remaining Distance to Travel	Lr =	752.5	Ft.	
Remaining Time to Travel	Tr =	9.27	Min.	See Fig. 3-3
Total Time of Concentration	Tc =	12.05	Min.	
Intensity	I =	4.78	Ins/hr.	
C x A	CA =	8.35		
Designed Runoff	Q =	39.94	Cfs	

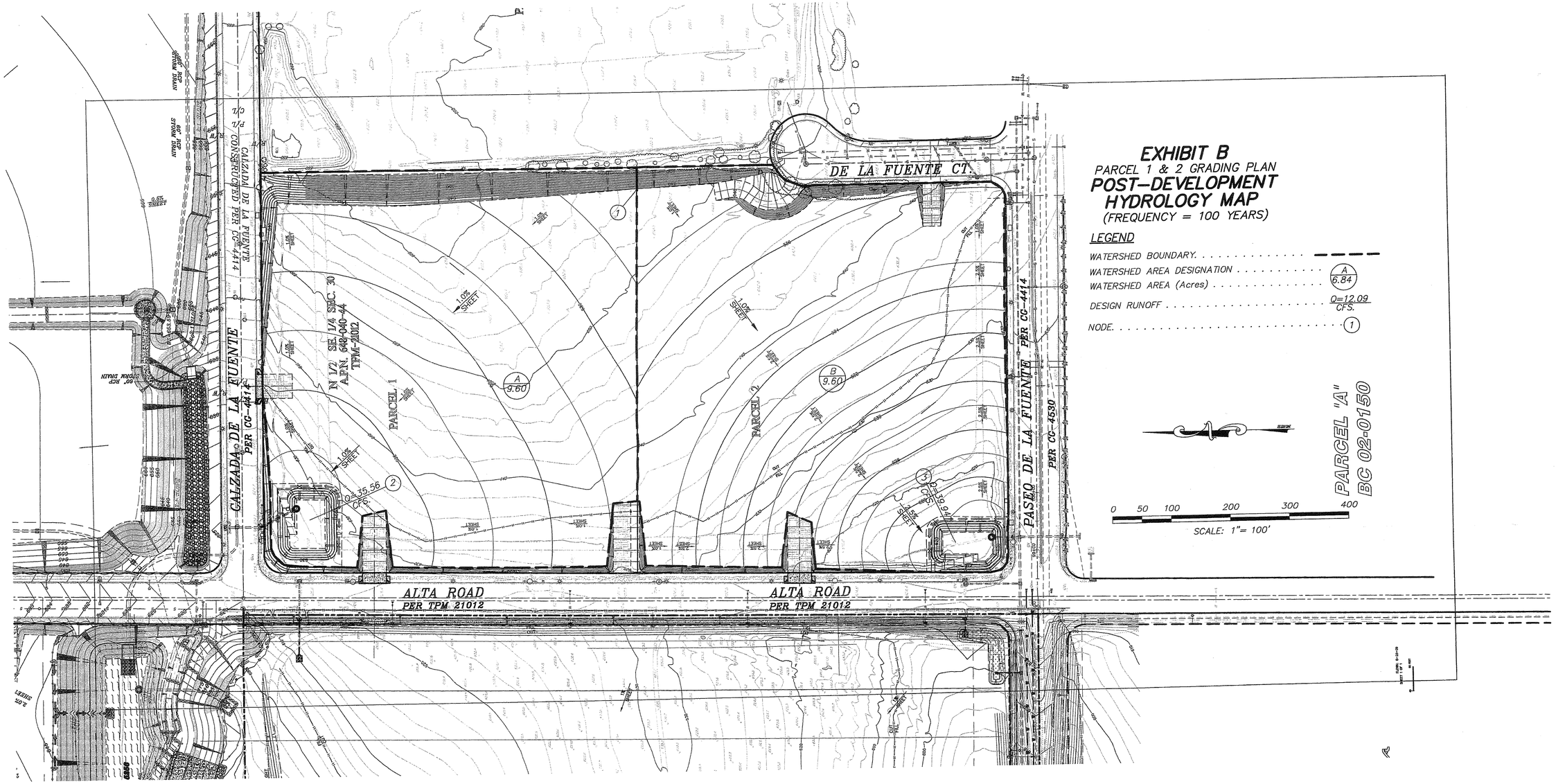


EXHIBIT B
PARCEL 1 & 2 GRADING PLAN
POST-DEVELOPMENT
HYDROLOGY MAP
(FREQUENCY = 100 YEARS)
LEGEND
WATERSHED BOUNDARY
WATERSHED AREA DESIGNATION
WATERSHED AREA (Acres)
DESIGN RUNOFF
Q=12.09 CFS.
NODE
SCALE: 1"= 100'
0 50 100 200 300 400
PARCEL "A"
BC 02-0150
DE LA FUENTE CT.
CALZADA DE LA FUENTE
PER CG-4414
PASEO DE LA FUENTE
PER CG-4530
ALTA ROAD
PER TPM 21012
N 1/2, SE 1/4 SEC. 30
A.P.N. 649-040-44
TPM-21012
PARCEL 1
PARCEL 2
A
9.60
B
9.60
Q=35.56 CFS.
Q=39.94 CFS.
1.0% SHEET
0.5% SHEET
2.5% SHEET
60" RCP STORM DRAIN

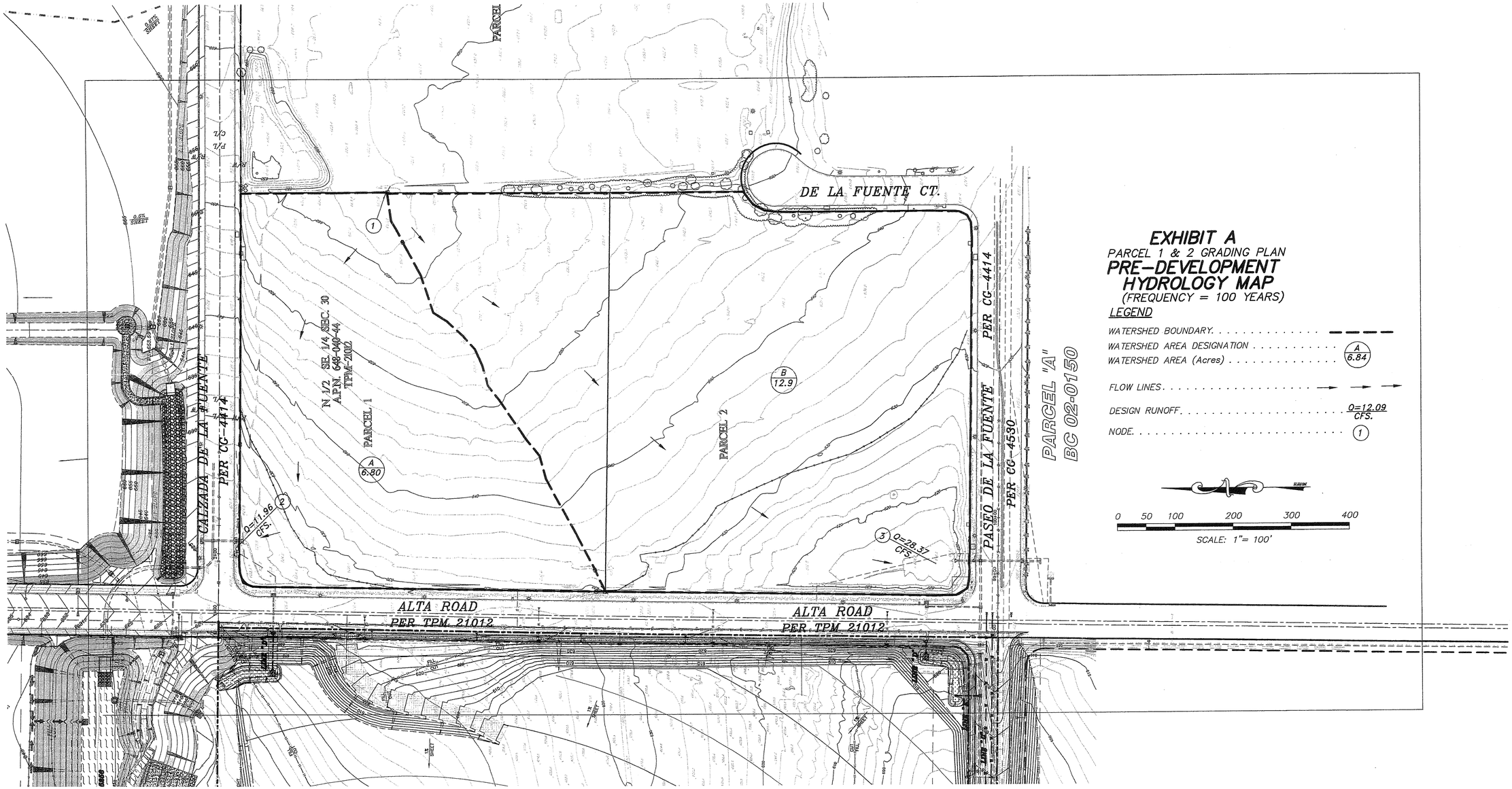


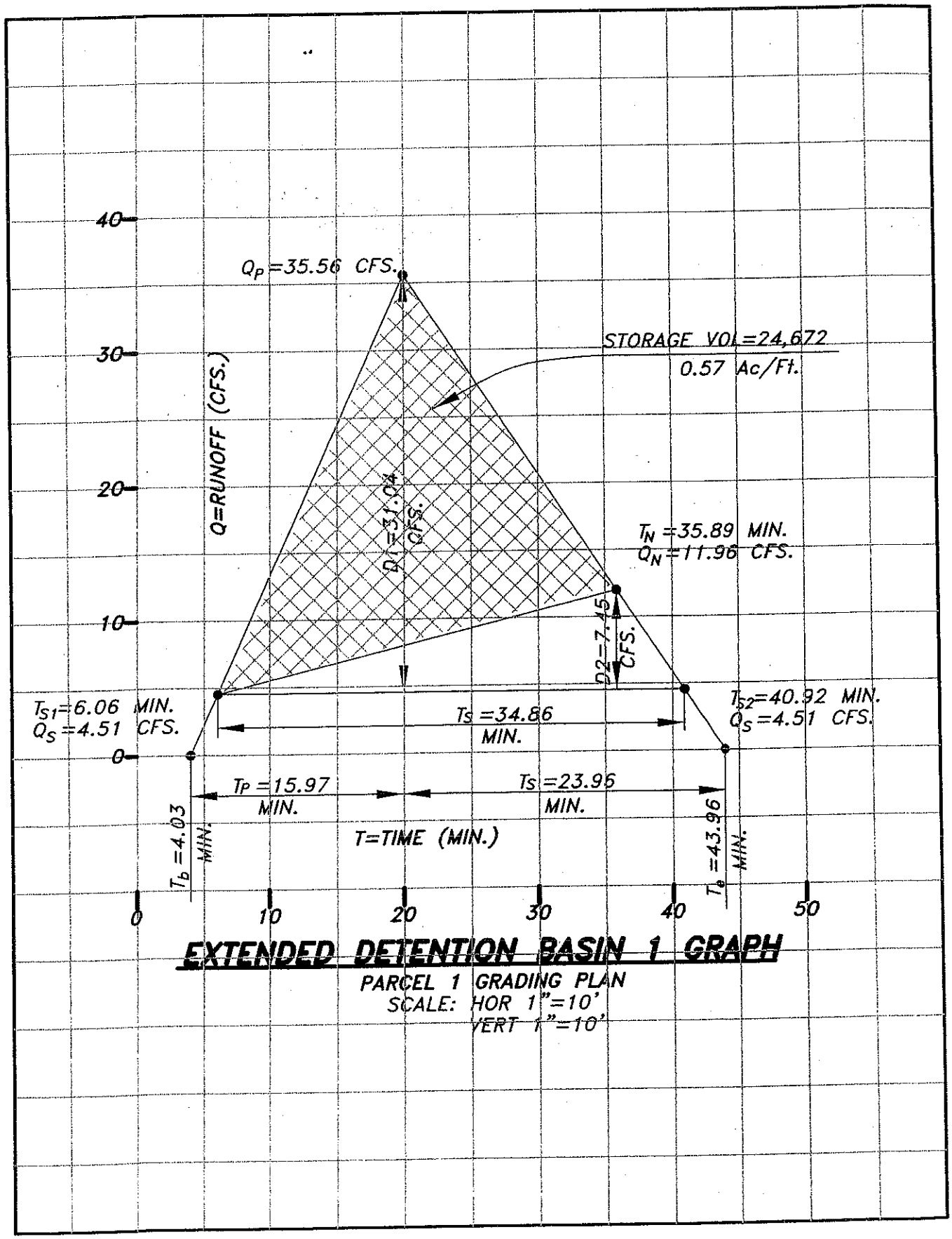
EXHIBIT A
PARCEL 1 & 2 GRADING PLAN
PRE-DEVELOPMENT
HYDROLOGY MAP
(FREQUENCY = 100 YEARS)
LEGEND
WATERSHED BOUNDARY
WATERSHED AREA DESIGNATION
WATERSHED AREA (Acres)
FLOW LINES
DESIGN RUNOFF
NODE
0=12.09 CFS.
SCALE: 1"= 100'
0 50 100 200 300 400
DE LA FUENTE CT.
CALZADA DE LA FUENTE
PER CG-4414
PASEO DE LA FUENTE
PER CG-4530
PER CG-4414
PARCEL "A"
BC 02-0150
N 1/2, SE 1/4 SEC. 30
A.P.N. 648-040-44
TPM-2002
PARCEL 1
PARCEL 2
A
6.80
B
12.9
Q=11.96 CFS.
Q=28.37 CFS.
ALTA ROAD
PER TPM 21012
ALTA ROAD
PER TPM 21012

HYDRAULICS CALCULATION
Project Name: PARCEL 1 GRADING PLAN
Location: East Otay Mesa
Job. No. 184-101

October 26, 2009

EXTENDED DETENTION BASIN No. 1

INPUT VARIABLES (Urban Development)	100 Yr. Storm		
Six (6)Hour Precipitation Amount (Inches)	P_6 =	3.20	Fig. 3-1
Total Time of Concentration (Min.)	Tc =	14.42	See Post-Development
Coefficient of Runoff	C =	0.87	Table 3-1
Area	A =	9.6	Ac.
Time to Peck (Tp = 1.1072 x Tc)	Tp =	15.97	Minutes
Time of Hydrograph to Begin Tb = 20-Tp	Tb =	4.03	Minutes
Time of Hydrograph to End (Te =20+1.5xTp)	Te =	43.96	Minutes
I_{Tc} = 7.44 x P6/Tc^.645	I_{Tc} =	4.26	Ins/hr.
Qp = C x I_{Tc} x A, (C.F.S.)	Qp =	35.56	CFS
SURROUNDING FLOW (Qs)			
Depth of Precipitation for 2 Hours (D_{120} = 0.6785 x P_6)	D_{120} =	2.17	Inches
Depth of Precipitation for Hydrograph (D_H = P_6 xTc^.355/5.83)	D_H =	1.42	Inches
Surrounding Intensity: Is = 60(D_{120} - D_H) / (120 - 2.5Tc)	Is =	0.54	Ins./hr.
Qs = C x Is x A ,(C.F.S.)	Qs =	4.51	CFS
OUTFLOW (Pre-Development)			
Pre- Runoff	Qn =	11.96	See Pre-Development
			Hydrology
RESERVOIR STORAGE			
D1 = Qp -Qs	D1 =	31.04	CFS
D2 = Qn - Qs	D2 =	7.45	CFS
Ts1 =Begin Surrounding Time	Ts1 =	6.06	Minutes
T_{s2} = End Surrounding Time	T_{s2} =	40.92	Minutes
Tn = Outflow Hydrograph Time Intercept	Tn =	35.89	Minutes
Vr =[(D1-D2) x (Ts2-Ts1)] / 2 x 60: (Cu.Ft.)	Vr =	24,672	Cu.Ft.
		0.57	Ac./Ft.
Storm Water Quality			
	Volume-based		Eq. Vq = C x P_{85} x A
85th Percentile Rainfall	P_{85} =	0.8	Inch
Runoff Coefficient	C =	0.87	
Storm Water Quality Volume	Vol.q =	6.6816	Ac./In.
	Or	24,254.21	Cu.Ft.
Total Detained Volume =	Stored =	48,925.79	Cu.Ft.
	Flow-based		Eq. Qwq = CIA
Intensity	I =	0.2	in/hr
Runoff Coefficient	C =	0.87	
Storm Water Quality Runoff	Qwq =	1.6704	CFS



EXTENDED DETENTION BASIN 1 GRAPH

PARCEL 1 GRADING PLAN
SCALE: HOR 1"=10'
VERT 1"=10'

HYDRAULICS CALCULATION

Project Name: PARCEL 1 GRADING PLAN

Location: East Otay Mesa

Job. No. 184-101

October 26, 2009

EXTENDED DETENTION BASIN No. 1

INPUT VARIABLES (Urban Development)	100 Yr. Storm		
Six (6)Hour Precipitation Amount (Inches)	P_6 =	3.20	Fig. 3-1
Total Time of Concentration (Min.)	Tc =	14.42	See Post-Development
Coefficient of Runoff	C =	0.87	Table 3-1
Area	A =	9.6	Ac.
Time to Peck (Tp = 1.1072 x Tc)	Tp =	15.97	Minutes
Time of Hydrograph to Begin Tb = 20-Tp	Tb =	4.03	Minutes
Time of Hydrograph to End (Te =20+1.5xTp)	Te =	43.96	Minutes
I_{Tc} = 7.44 x P6/Tc^.645	I_{Tc} =	4.26	Ins/hr.
Qp = C x I_{Tc} x A, (C.F.S.)	Qp =	35.56	CFS
SURROUNDING FLOW (Qs)			
Depth of Precipitation for 2 Hours (D_{120} = 0.6785 x P_6)	D_{120} =	2.17	Inches
Depth of Precipitation for Hydrograph (D_H = P_6 xTc^.355/5.83)	D_H =	1.42	Inches
Surrounding Intensity: Is = 60(D_{120} - D_H) / (120 - 2.5Tc)	Is =	0.54	Ins./hr.
Qs = C x Is x A ,(C.F.S.)	Qs =	4.51	CFS
OUTFLOW (Pre-Development)			
Pre- Runoff	Qn =	11.96	See Pre-Development
			Hydrology
RESERVOIR STORAGE			
D1 = Qp -Qs	D1 =	31.04	CFS
D2 = Qn - Qs	D2 =	7.45	CFS
Ts1 =Begin Surrounding Time	Ts1 =	6.06	Minutes
T_{s2} = End Surrounding Time	T_{s2} =	40.92	Minutes
Tn = Outflow Hydrograph Time Intercept	Tn =	35.89	Minutes
Vr =[(D1-D2) x (Ts2-Ts1)] / 2 x 60: (Cu.Ft.)	Vr =	24,672	Cu.Ft.
		0.57	Ac./Ft.
Storm Water Quality			
	Volume-based		Eq. Vq = C x P_{85} x A
85th Percentile Rainfall	P_{85} =	0.8	Inch
Runoff Coefficient	C =	0.87	
Storm Water Quality Volume	Vol.q =	6.6816	Ac./In.
	Or	24,254.21	Cu.Ft.
Total Detained Volume =	Stored =	48,925.79	Cu.Ft.
	Flow-based		Eq. Qwq = CIA
Intensity	I =	0.2	in/hr
Runoff Coefficient	C =	0.87	
Storm Water Quality Runoff	Qwq =	1.67	CFS

Volume & Hydraulics Calculations
Project Name: PARCEL1 GRADING PLAN
Location: East Otay Mesa
Job. No. 184-101

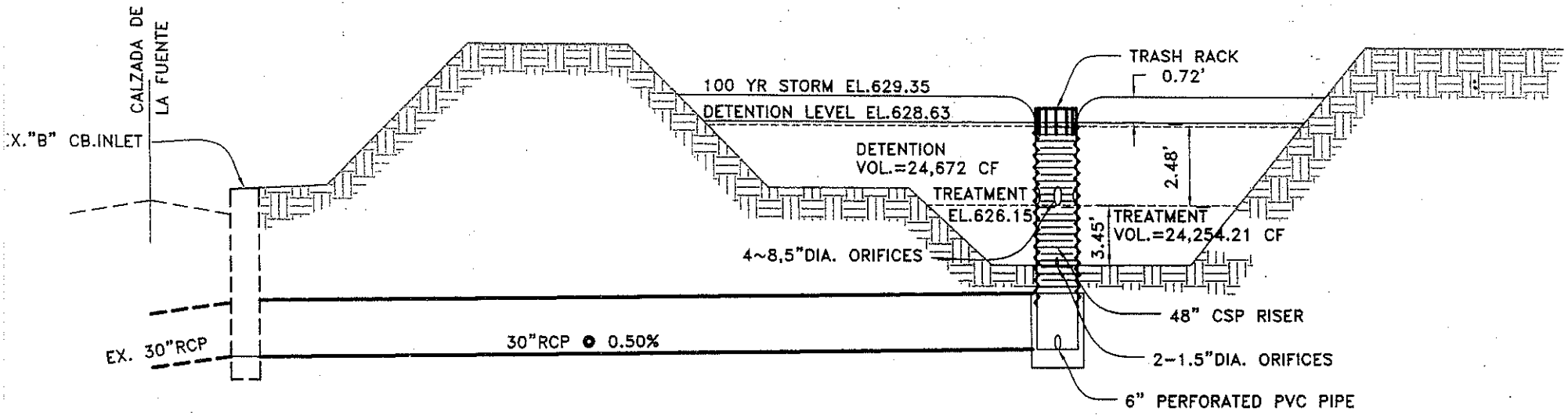
Oct. 20, 2009

Detention Basin No. 1					
Elev.	End Area	Average Areea	Volume	Accumul Vol.	Remarks
622.7	6,012.24				
623	6,205.11	6,108.68	1,832.60	1,832.60	
624	7,015.69	6,610.40	6,610.40	8,443.00	
625	7,700.06	7,357.88	7,357.88	15,800.88	
626	8,560.90	8,130.48	8,130.48	23,931.36	
627	9,295.53	8,928.22	8,928.22	32,859.57	
628	10,206.65	9,751.09	9,751.09	42,610.66	
629	10,991.74	10,599.20	10,599.20	53,209.86	
630	12,000.02	11,495.88	11,495.88	64,705.74	
	51				
Water Surface Elevation					
	Total Storage Volume (Vol total) =		48,925.79	Cu.Ft.	Detention Basin
	Water Surface Elevation (W.S) =		628.63		
Treatment Water Surface Elevation					
	Trfeatment Storage Volume (Vol trreat)=		24,254.21	Cu.Ft.	
	Water Surface Elevation (W.S. treat) =		626.15		
Detention Basin Hydraulics					
	Post Development Detention Height (Hs) =		2.48	Ft.	
	Pre-Development Runoff (Q) =		11.96	Cfs	
	Oriufice Discharge Cloefficient (Co) =		0.60		
	Area of Orifice (Ao) =		1.58	Ft²	
		Install 4 Orifice at 8.5" Diameter			At Quarter Side
	Post-Development Runoff (Q) =		35.56	Cfs	
	Diameter of CSP Riser (48") =		4	Ft. (48"CSP)	
	Runoff over the Rim of Riser (Qr) =		23.60	Cfs	Qpost-Qpre
		Head (h) =	0.72	Ft.	
	HYDRAULICS OF PIPE				
	Exiting Hydraulic Grade Line (HGL) =		621.57		Ex. Per CG4414
	Post Development Runoff (Q100) =		35.56	CFS	
		Pipe Lengt (L) =	28.40	Ft.	
	Pipe Diamter (d) =		2.50	Ft.	
	Friction Slope (Sf) =		0.75%		
	Manning's Roughness Coef. (n)		0.013		
	Friction Head (hf) =		0.21	Ft.	
		Velocity (V) =	7.24	Ft./Sec.	
	Hydraulic Grade Line (HGLin) =		621.78		
	Entrance Coef.(Ce) =		0.2	Ft.	
	Entrance Loss (He) =		1.45		
	Water Surface Elev.(W.S.) =		623.23		

Volume & Hydraulics Calculations
Project Name: PARCEL1 GRADING PLAN
Location: East Otay Mesa
Job. No. 184-101

Oct. 20, 2009

Top Surface Area (Atop) =	8,587.46	Ft^2	
Bottom Area of the Pond (Abtm) =	6,012.24	Ft^2	
Average Area (Aav) =	7,299.85	Ft^2	
Trreatment Top Elevation (Elev top) =	626.15		
Bottom Pond elevation (Elev.btm) =	622.70		
Drawn Down Time =	64	Hours	
Orifice Area (Oo) =	0.0245	Ft^2	
2 ~Orifice Dia. (Do) =	0.13	Ft	
Or	1.50	inches	



TYPICAL EXTENTED DETENTION BASIN 1

PARCELS 1 & 2

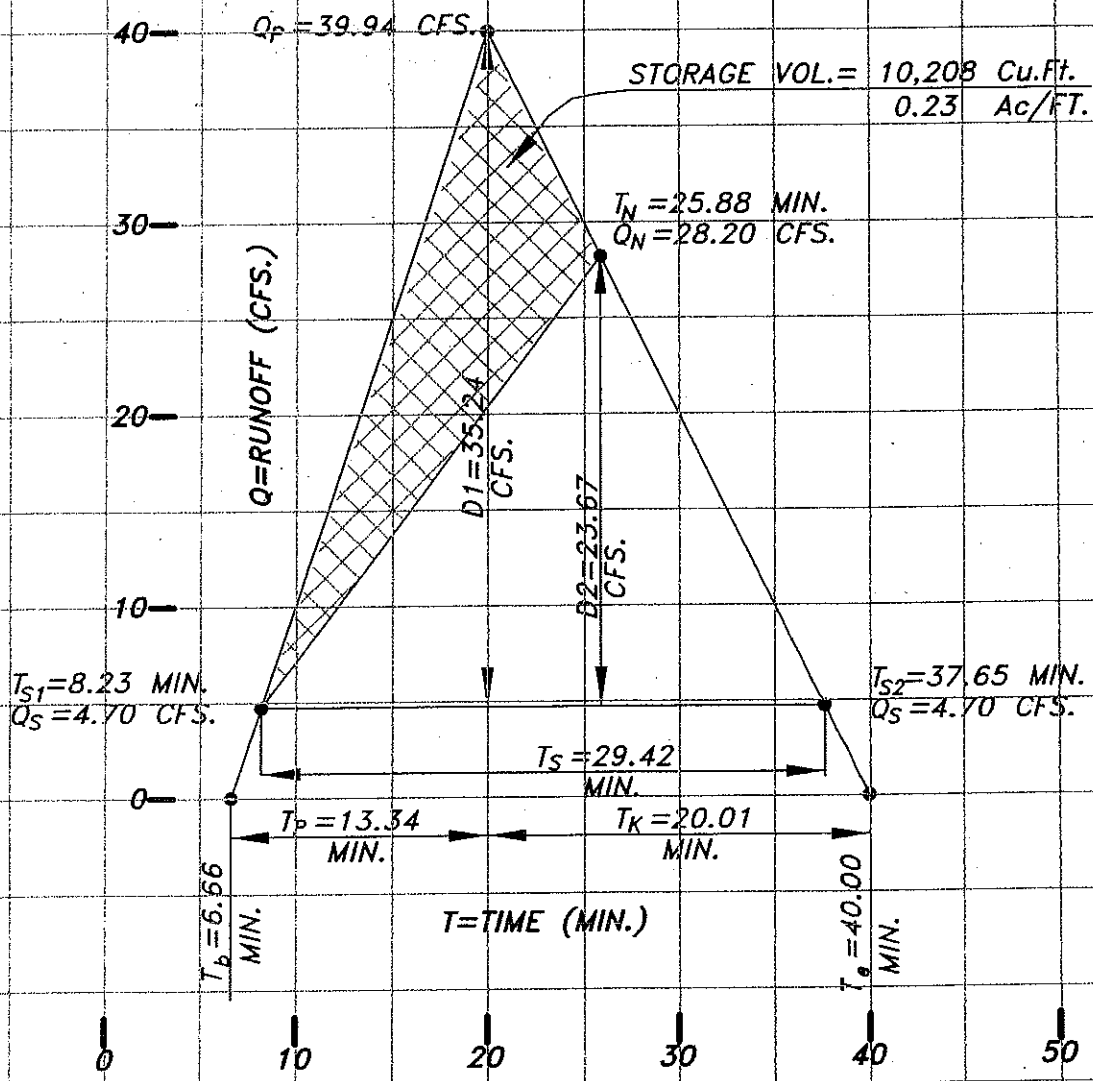
NO SCALE

HYDRAULICS CALCULATION
Project Name: PARCEL 2 GRADING PLAN
Location: East Otay Mesa
Job. No. 184-101

October 26, 2009

EXTENDED DETENTION BASIN No. 2

INPUT VARIABLES (Urban Development)	100 Yr. Storm		
Six (6)Hour Precipitation Amount (Inches)	P_6 =	3.20	Fig. 3-1
Total Time of Concentration (Min.)	Tc =	12.05	See Post-Development
Coefficient of Runoff	C =	0.87	Table 3-1
Area	A =	9.6	Ac.
Time to Peck (Tp = 1.1072 x Tc)	Tp =	13.34	Minutes
Time of Hydrograph to Begin Tb = 20-Tp	Tb =	6.66	Minutes
Time of Hydrograph to End (Te =20+1.5xTp)	Te =	40.00	Minutes
I_{Tc} =.7.44 x P6/Tc^.645	I_{Tc} =	4.78	Ins/hr.
Qp = C x I_{Tc} x A, (C.F.S.)	Qp =	39.94	CFS
SURROUNDING FLOW (Qs)			
Depth of Precipitation for 2 Hours (D_{120} = 0.6785 x P_6)	D_{120} =	2.17	Inches
Depth of Precipitation for Hydrograph (D_H = P_6 xTc^.355/5.83)	D_H =	1.33	Inches
Surrounding Intensity: Is = 60(D_{120} - D_H) / (120 - 2.5Tc)	Is =	0.56	Ins./hr.
Qs = C x Is x A ,(C.F.S.)	Qs =	4.70	CFS
OUTFLOW (Pre-Development)			
Pre- Runoff	Qn =	28.37	See Pre-Development
			Hydrology
RESERVOIR STORAGE			
D1 = Qp -Qs	D1 =	35.24	CFS
D2 = Qn - Qs	D2 =	23.67	CFS
Ts1 =Begin Surrounding Time	Ts1 =	8.23	Minutes
T_{s2} = End Surrounding Time	T_{s2} =	37.65	Minutes
Tn = Outflow Hydrograph Time Intercept	Tn =	25.79	Minutes
Vr =[(D1-D2) x (Ts2-Ts1)] / 2 x 60: (Cu.Ft.)	Vr =	10,208	Cu.Ft.
		0.23	Ac./Ft.
Storm Water Quality			
	Volume-based		Eq. Vq = C x P_{85} x A
85th Percentile Rainfall	P_{85} =	0.8	Inch
Runoff Coefficient	C =	0.87	
Storm Water Quality Volume	Vol.q =	6.6816	Ac./In.
	Or	24,254.21	Cu.Ft.
Total Detained Volume =	Stored =	34,462.62	Cu.Ft.
	Flow-based		Eq. Qwq = CIA
Intensity	I =	0.2	in/hr
Runoff Coefficient	C =	0.87	
Storm Water Quality Runoff	Qwq =	1.67	CFS



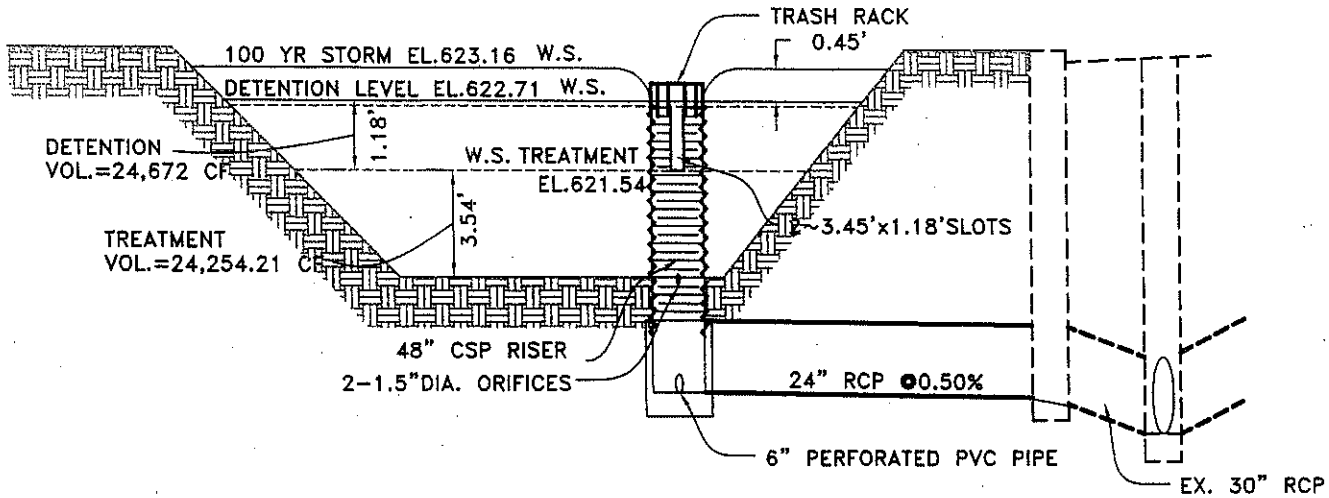
EXTENDED DETENTION BASIN 2 GRAPH

PARCEL 2 GRADING PLAN
SCALE: HOR 1"=10'
VERT 1"=10'

Volume & Hydraulics Calculations
Project Name: PARCEL2 GRADING PLAN
Location: East Otay Mesa
Job. No. 184-101

Oct. 20, 2009

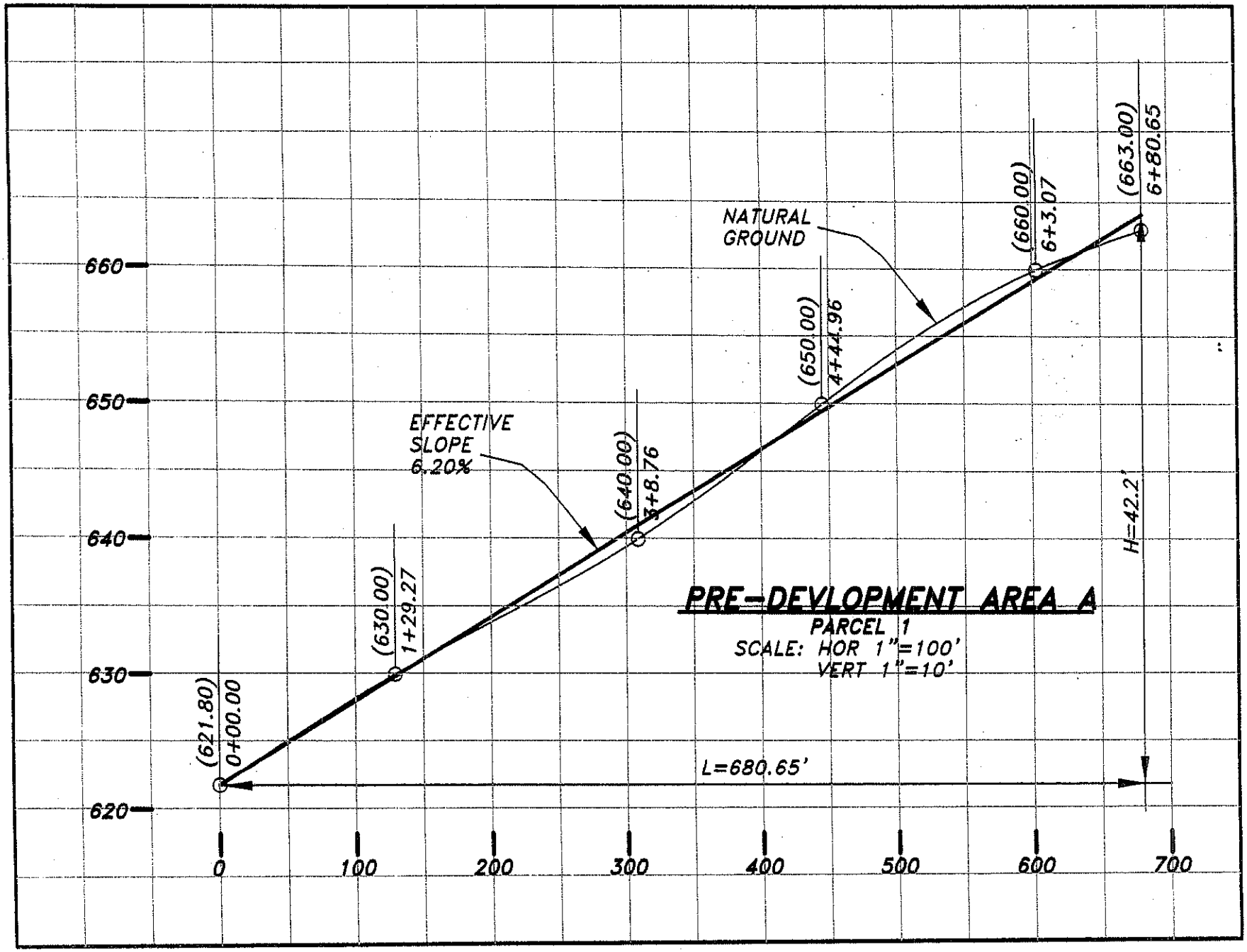
Detention Basin No. 2					
Elev.	End Area	Average Areea	Volume	Accumul Vol.	Remarks
618	5528				
619	6,175.03	5,851.52	5,851.52	5,851.52	
620	7,048.06	6,611.55	6,611.55	12,463.06	
621	7,745.30	7,396.68	7,396.68	19,859.74	
622	8,616.84	8,181.07	8,181.07	28,040.81	
623	9,364.34	8,990.59	8,990.59	37,031.40	
624	10,286.17	9,825.26	9,825.26	46,856.66	
Water Surface Elevation					
	Total Storage Volume (Vol total) =		34,462.62	Cu.Ft.	Detention Basin
	Water Surface Elevation (W.S) =		622.71		
Treatment Water Surface Elevation					
	Trfeatment Storage Volume (Vol trreat)=		24,254.21	Cu.Ft.	
	Water Surface Elevation (W.S. treat) =		621.54		
Detention Basin Hydraulics					
	Post Development Detention Height (Hs) =		1.18	Ft.	Height
	Pre-Development Runoff (Q) =		28.37	Cfs	
	Sharp Crested Weir Coefficient (Cscw) =		3.33		
	Length of Weir =		6.91	Ft.	Base
	Use 2-3.35' Slot on a 48" CSP Riser		3.45	Ft.	
	Post-Development Runoff (Q) =		39.94	Cfs	
	Diameter of CSP Riser (48") =		4	Ft.	
	Runoff over the Rim of Riser (Qr) =		11.66	Cfs	Qpost-Qpre
		Head (h) =	0.45	Ft.	
	HYDRAULICS OF PIPE				
	Exiting Hydraulic Grade Line (HGL) =		621.57		Per TM 21012
	Post Development Runoff (Q100) =		39.94	CFS	
		Pipe Lengt (L) =	28.00	Ft.	
	Pipe Diamter (d) =		2.00	Ft.	
	Friction Slope (Sf) =		3.12%		
	Manning's Roughness Coef. (n)		0.013		
	Friction Head (hf) =		0.87	Ft.	
		Velocity (V) =	30.31	Ft./Sec.	
	Hydraulic Grade Line (HGLin) =		622.44		
	Free Board (FB) =		1.06	Ft.	
	TREATMENT HYDRAULICS				
	Top Surface Area (Atop) =		8,159.54	Ft^2	
	Bottom Area of the Pond (Abtm) =		5,528.00	Ft^2	
	Average Area (Aav) =		6,843.77	Ft^2	
	Trreatment Top Elevation (Elev top) =		621.54		
	Bottom Pond elevation (Elev.btm) =		618.00		
	Drawn Down Time =		53	Hours	
	Orifice Area (Oo) =		0.0286	Ft^2	
	2 ~Orifice Dia. (Do) =		0.13	Ft	
		Or	1.62	inches	

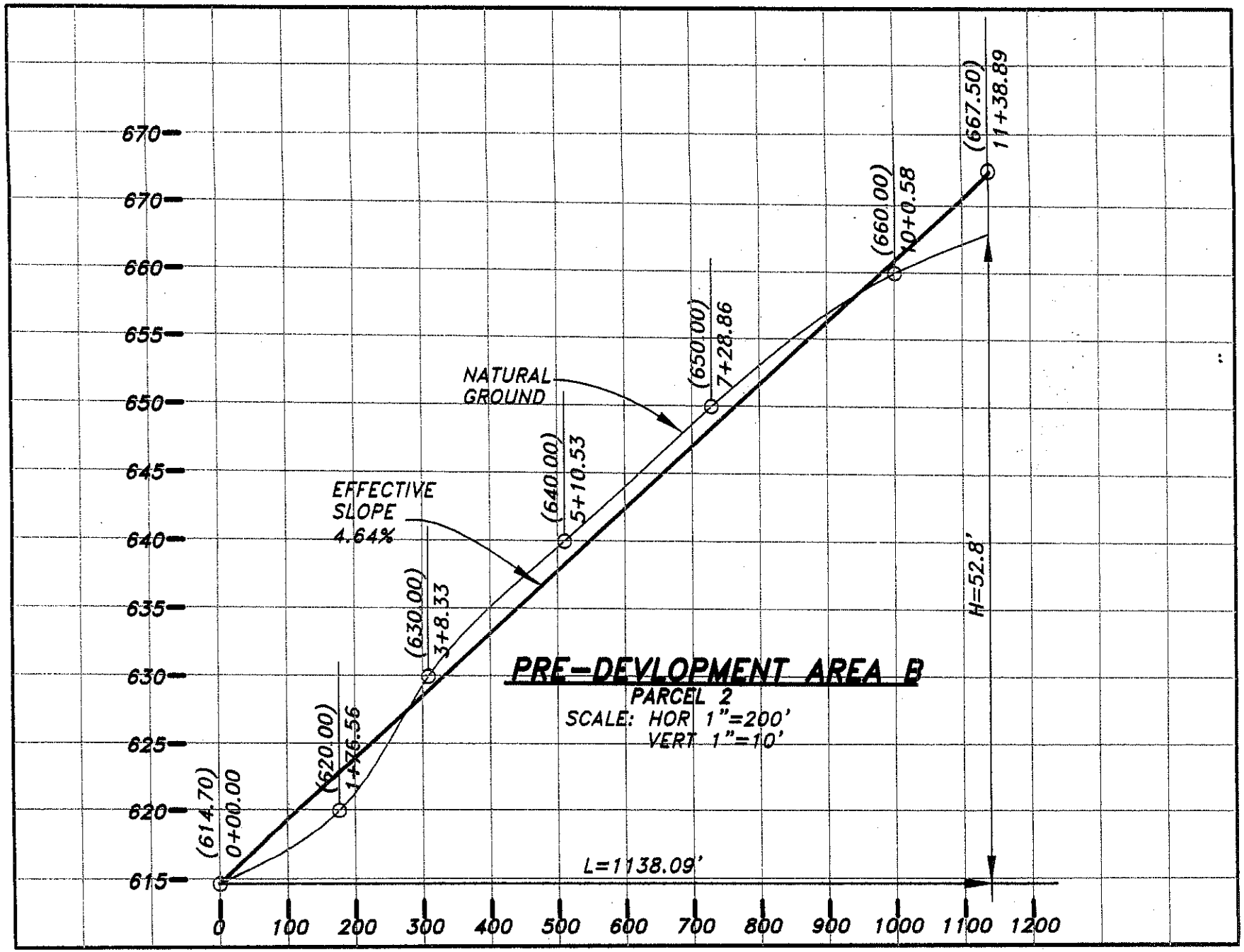


TYPICAL EXTENTED DETENTION BASIN 2

PARCELS 1 & 2

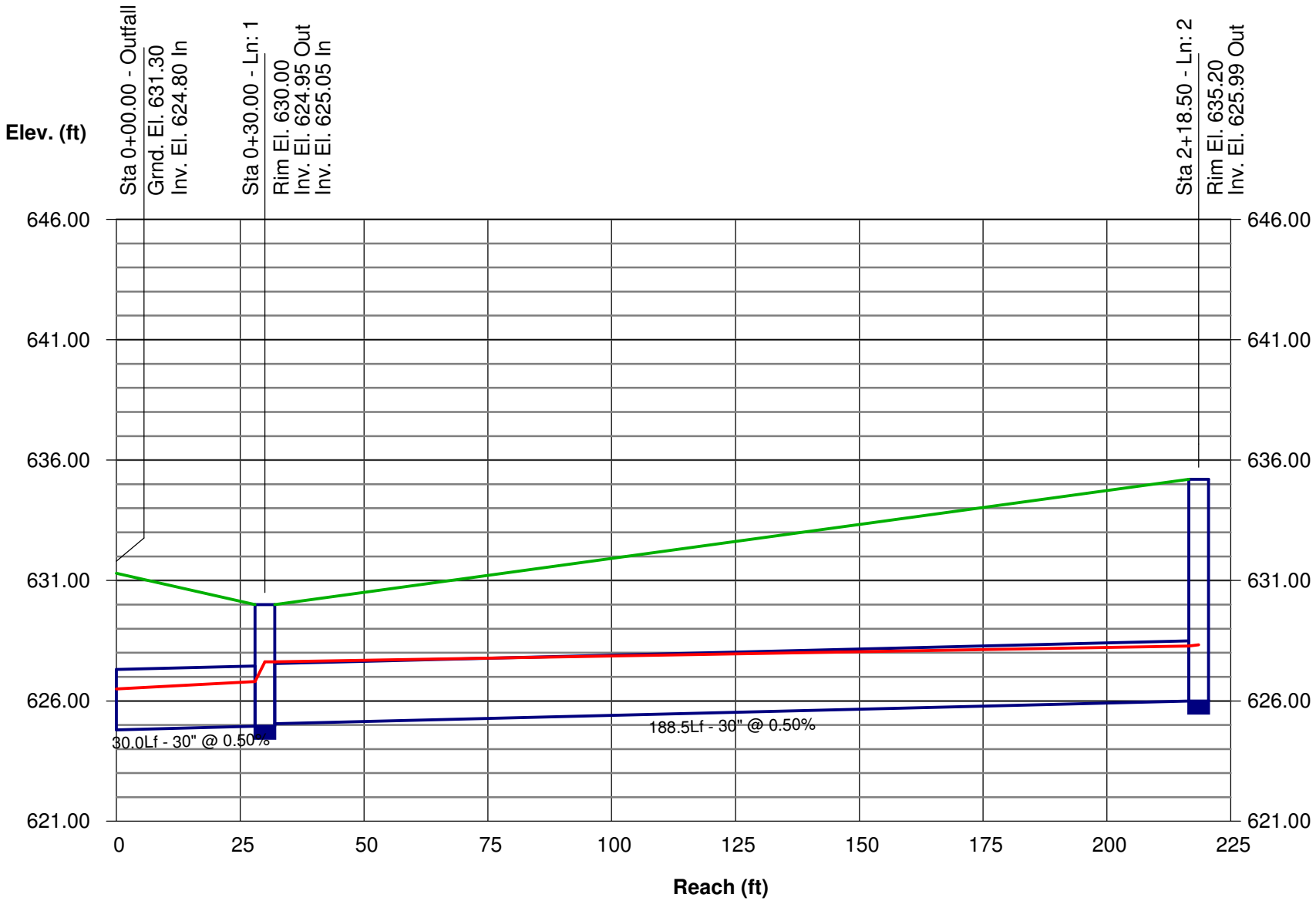
NO SCALE


PRE-DEVLOPMENT AREA A
PARCEL 1
SCALE: HOR 1"=100'
VERT 1"=10'
NATURAL GROUND
EFFECTIVE SLOPE 6.20%
(621.80) 0+00.00
(630.00) 1+29.27
(640.00) 3+8.76
(650.00) 4+44.96
(660.00) 6+3.07
(663.00) 6+80.65
L=680.65'
H=42.2'
620
630
640
650
660
0
100
200
300
400
500
600
700


PRE-DEVLOPMENT AREA B
PARCEL 2
SCALE: HOR 1"=200'
VERT 1"=10'
NATURAL GROUND
EFFECTIVE SLOPE 4.64%
(614.70) 0+00.00
(620.00) 1+76.56
(630.00) 3+8.33
(640.00) 5+10.53
(650.00) 7+28.86
(660.00) 10+0.58
(667.50) 11+38.89
H=52.8'
L=1138.09'
670
670
660
655
650
645
640
635
630
625
620
615
0
100
200
300
400
500
600
700
800
900
1000
1100
1200

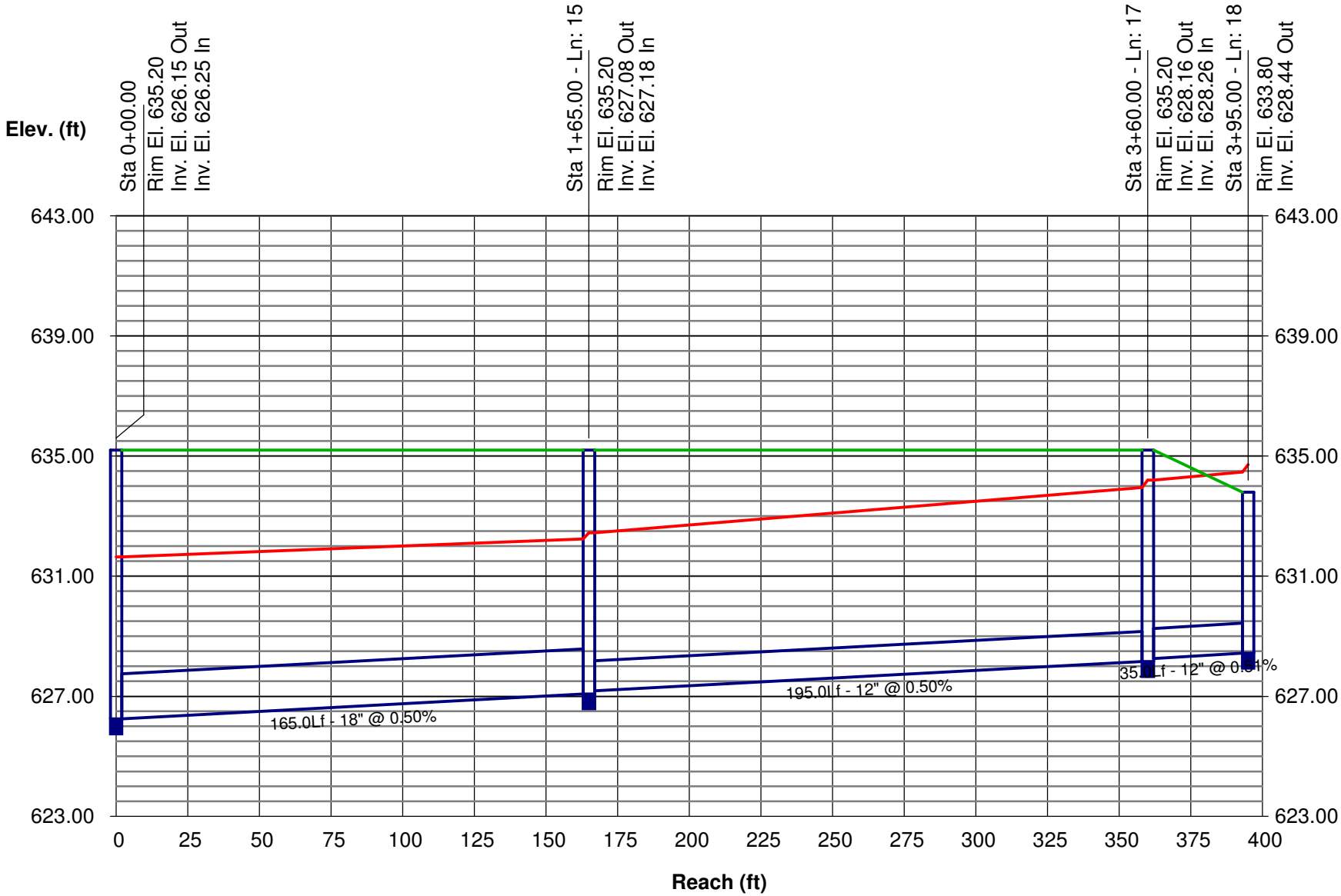
Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



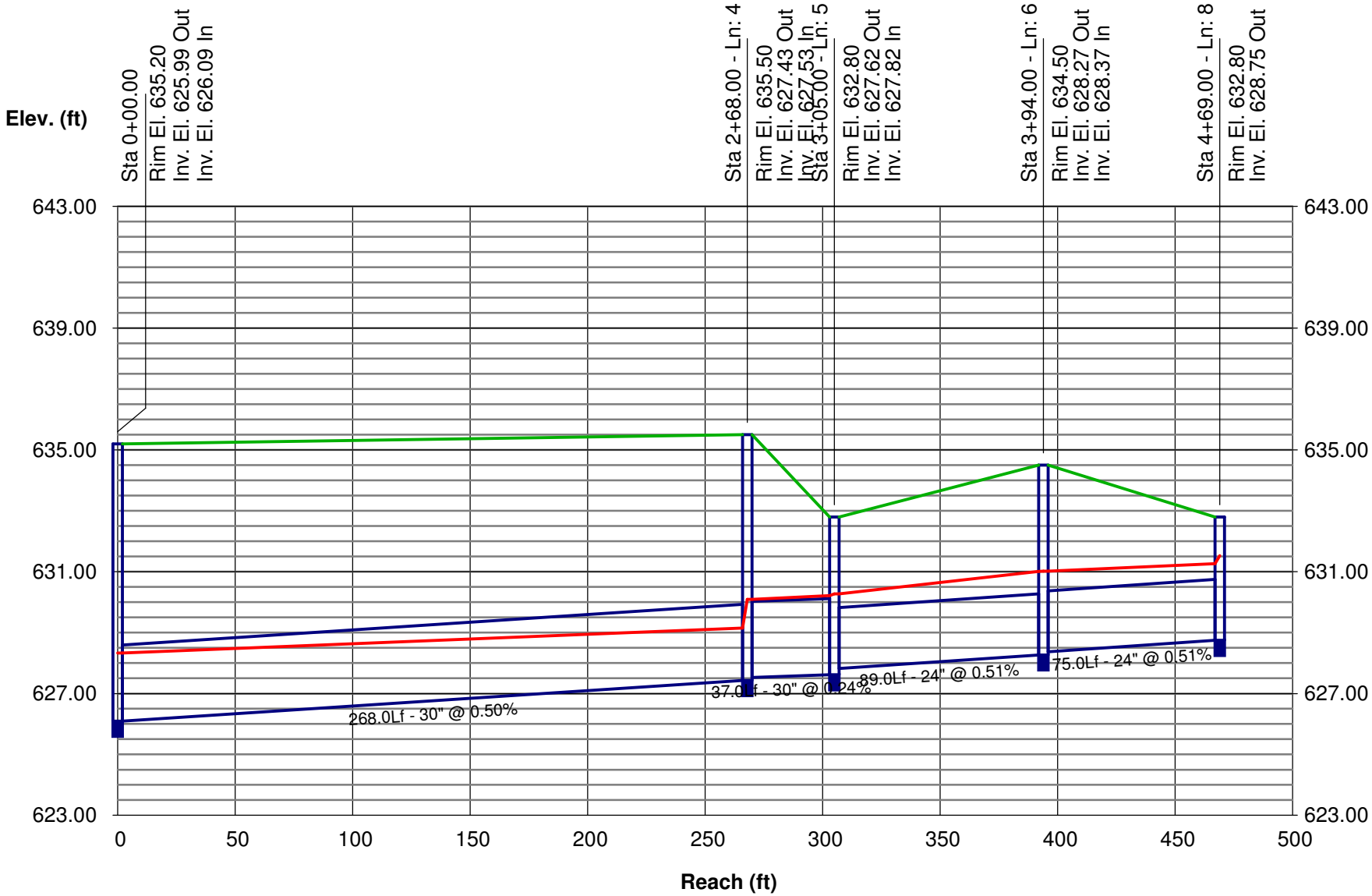
Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



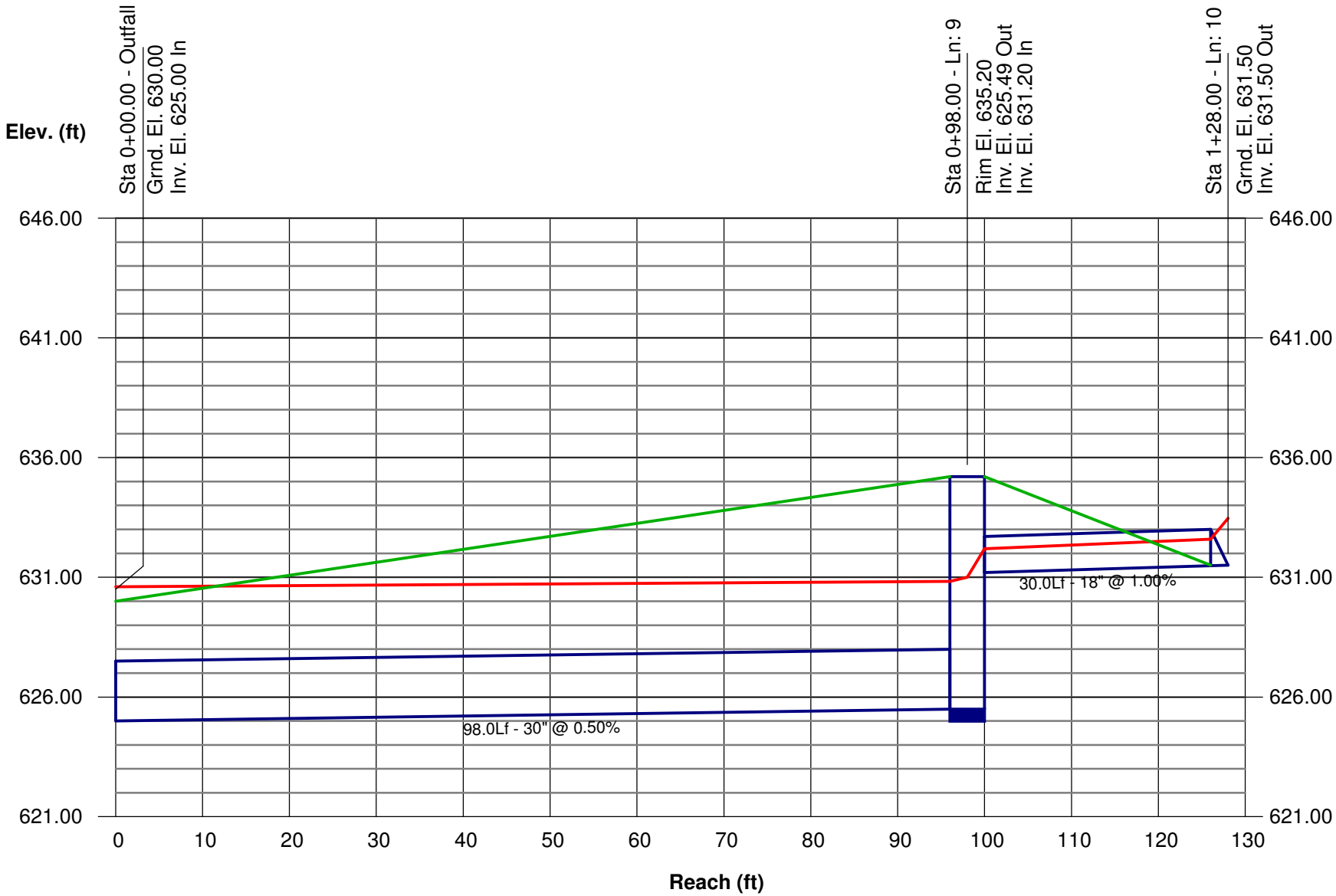
Storm Sewer Profile

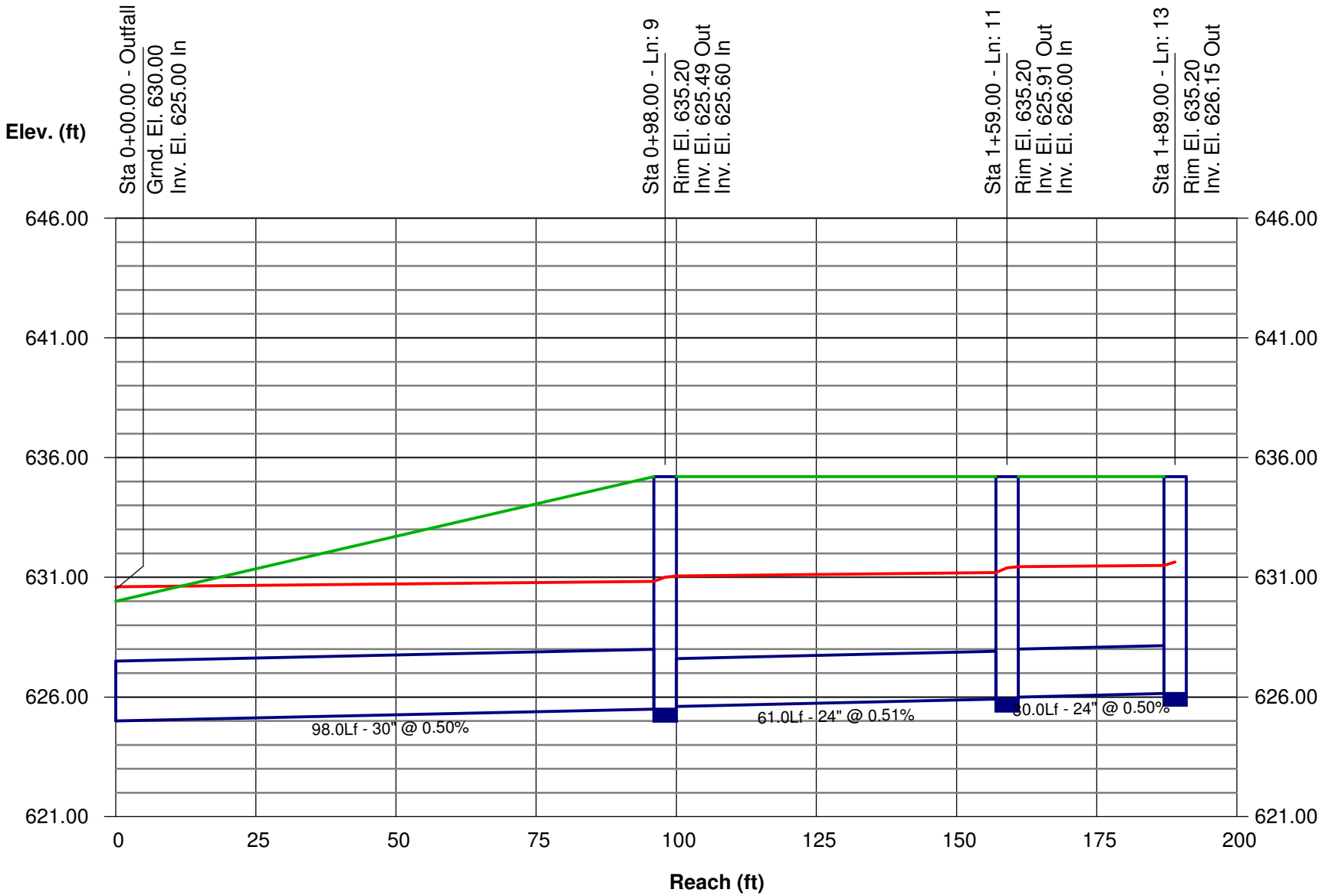
Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



Storm Sewer Profile

Proj. file: Pio Pico - Otay - Storm Sewer - 100 Year.stm



Storm Sewer Profile

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